

THE IMPACT OF CLIMATE CHANGE ON HUMAN SECURITY IN SOUTH AFRICA

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DECLARATION

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ABSTRACT

The Stern Review on the Economics of Climate Change is conclusive that climate change will lead to scarcity of the basic resources that sustain life for people around the world – fresh water supplies, food production and land for habitation and cultivation. It is argued that environmental scarcity leads to migration which in turn results in conflict in the receiving area as competition over resources develops.

Based on the main theories relating to resource scarcity and conflict, the purpose of this study is to examine the link between climate change and human security. The relevance of this research is the fact that the Stern Review concludes that climate change poses a serious threat to the world and that Africa will be one of the hardest hit continents. Africa is already vulnerable to climate variability and has the least capacity to respond, and this study aims to establish the impacts of resource scarcity on human security in South Africa.

The theoretical approach addresses the much debated concept of ‘human security’ as it has developed since the end of the Cold War and the analysis is based on the main conflict theories that maintain that competition over access to scarce resources is one of the root causes of violent conflict. The research design for this study is of an empirical nature with the units of analysis being states, physical events and processes and the resulting human actions. It is a descriptive analysis, interpreting the impact of climate change on scarce resources and the resulting propensity for conflict.

Much of the violence against migrants has been the result of varying degrees of xenophobia amongst all racial groups in South Africa. This study proposes the hypothesis that migration results in increased competition over scarce resources in receiving areas, which as a result of xenophobia leads to conflict. Based on the theoretical arguments put forward, the paper aims to determine what policy options for adaptation, mitigation and governance would be most likely to reduce the harmful impacts of climate change on vulnerable regions and groups of people in South Africa and neighbouring countries in order to contain migration and lessen the likelihood of violent conflict.

Having identified xenophobia as a spark that could ignite violent inter-group conflict it would be useful to gain some theoretical insight into reducing group prejudice and attaining group cooperation through inter-group contact.

It is apparent that there is no single theoretical approach that can be applied to gain a better insight into the complex link between resource scarcity and conflict. The different theories are mutually compatible and each theoretical perspective contributes a partial elaboration to and additional insights into the climate change/conflict hypothesis. There is possibly room for a new theoretical approach to gain a better understanding of the complexity and the uncertainties that are inherent in the study of a mechanism as complex as climate change.

South Africa has the responsibility to use its global political influence to promote a shared understanding of responsible behaviour across all societies. Active participation will enable South Africa to guide global negotiations towards outcomes that will lessen the impact of climate change on the most vulnerable countries and populations. In conclusion, possible policies and actions are identified that could support these objectives. Without urgent, appropriate intervention climate change will undermine any efforts to achieve the Millennium Development Goals, and a crippled African continent will be a threat to world security.

OPSOMMING

Die ‘Stern Review on the Economics of Climate Change’ kom tot die slotsom dat klimaatsverandering veroorsaak dat basiese hulpbronne wat mense regoor die wêreld aan die lewe hou skaarser word – varswaterbronne, voedselproduksie en grond om te bewoon en te bewerk. Die mening is dat omgewingsnood tot migrasie lei wat weer konflik in die ontvangsarea veroorsaak aangesien mededinging vir hulpbronne dan ontwikkel.

Gebaseer op die vernaamste teorieë wat verband hou met hulpbronskaarste en konflik, is die doel van hierdie tesis om die verband tussen klimaatsverandering en menslike sekuriteit te bepaal. Die relevansie van hierdie navorsing is die feit dat die Stern Review tot die gevolgtrekking kom dat klimaatsverandering ’n ernstige bedreiging vir die wêreld inhou en dat Afrika een van die kontinente is wat die hardste getref gaan word. Afrika is reeds blootgestel aan wisselvallige klimaatstoestande en beskik oor die minste kapasiteit om te reageer daarop. Hierdie tesis het ten doel om die impak van hulpbronskaarste op menslike sekuriteit in Suid-Afrika na te vors.

Die teoretiese benadering ondersoek die veel besproke konsep van ‘menslike sekuriteit’ soos dit ontwikkel het sedert die einde van die Koue Oorlog en die ontleding is gebaseer op die vernaamste konflikteorieë wat beweer dat mededinging oor toegang tot skaars hulpbronne een van die primêre oorsake van gewelddadige konflik is. Die navorsingsontwerp vir hierdie studie is empiries van aard met die verskillende eenhede wat ontleed word: regering, fisiese gebeure en prosesse en die daaropvolgende menslike optrede. Dit is ’n beskrywende ontleding wat die impak van klimaatsverandering op skaars hulpbronne en die gevolglike neiging tot konflik probeer interpreteer.

’n Groot deel van die geweld teen migrante is die gevolg van wisselende grade van vreemdelinge haat onder alle rassegroepe in Suid-Afrika. Hierdie tesis stel die hipotese dat migrasie toenemende mededinging oor skaars hulpbronne in ontvangsareas veroorsaak, wat as ’n gevolg van vreemdelinge haat op konflik uitloop. Gebaseer op die teoretiese argumente wat aangevoer word, het die tesis ten doel om vas te stel watter beleidsopsies vir aanpassing, versagting en bestuur die beste sal wees om die skadelike impak van klimaatsverandering op

kwesbare streke en groepe mense in Suid-Afrika en buurlande te beheer sodat migrasie in toom gehou en die voorkoms van gewelddadige konflik verminder kan word.

Nadat vreemdelinge haat geïdentifiseer is as die vonk wat moontlik konflik tussen groepe kan laat vlamvat, is dit nuttig om teoretiese insig te verkry in die vermindering van groepsvooroordeel en die verkryging van groepsamewerking deur middel van kontak tussen groepe.

Dit is duidelik dat daar geen enkele teoretiese benadering is wat toegepas kan word om beter insig te verkry in die komplekse verband tussen hulpbronskaarste en konflik nie. Die verskillende teorieë is wedersyds versoenbaar en elke teoretiese perspektief dra gedeeltelik by tot en verskaf bykomende insig in die klimaatsverandering-/konflikhipotese. Daar is moontlik ruimte vir 'n nuwe teoretiese benadering om beter begrip te ontwikkel vir die ingewikkeldheid en onsekerhede wat gepaardgaan met die bestudering van 'n onderwerp so kompleks soos dié van klimaatsverandering.

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LIST OF ACRONYMS

| | |
|----------|------------------------------------------------------------------|
| APRM | African Peer Review Mechanism |
| AU | African Union |
| CICERO | Centre for International Climate & Environmental Research - Oslo |
| CSIR | Council for Scientific and Industrial Research |
| DC's | Developed Countries |
| GECHS | Global Environmental Change & Human Security |
| GHG | Green House Gas |
| GM | Genetically modified |
| HIV/AIDS | Human Immunodeficiency Virus/Acquired Immune Deficiency Virus |
| HDI | Human Development Index |
| HM | Her Majesty |
| IPCC | Intergovernmental Panel on Climate Change |
| IRIN | Integrated Regional Information Networks |
| ISS | Institute for Security Studies |
| LDC's | Least Developed Countries |
| MDG's | Millennium Development Goals |
| NEPAD | New Partnership for Africa's Development |
| NGO | Non-Governmental Organisation |
| PRIO | Peace Research Institute Oslo |
| R&D | Research and development |
| SA | South Africa |
| SADC | Southern African Development Community |
| SAIIA | South African Institute of International Affairs |
| SAHIMS | Southern Africa Humanitarian Information Management Network |
| SAMP | Southern African Migration Project |
| SAPA | South African Press Association |
| UN | United Nations |
| UNCHS | United Nations Commission on Human Security |
| UNDP | United Nations Development Programme |

| | |
|--------|-------------------------------------------------------|
| UNEP | United Nations Environmental Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNHCR | United Nations High Commission on Refugees |
| UNPA | United Nations Population Agency |
| UNPF | United Nations Population Fund |
| UNSC | United Nations Security Council |
| WFP | World Food Programme |

CHAPTER 1

INTRODUCTION

Scientific evidence now appears conclusive: Climate change is a serious global threat and it demands an urgent global response. Debate continues as to the causes of climate change – human or cyclical – but it is accepted that climate change will affect the basic resources that sustain life for people around the world – fresh water supplies, food production and land for habitation and cultivation. Millions of people, but particularly those in underdeveloped regions, could suffer severe droughts and resulting hunger, water shortage, devastating disease and coastal flooding as global temperatures rise.

The actions that are taken in the next 10-20 years could have a decisive effect on the climate in the second half of this century and in the next. Irresponsible and ‘business as usual’ actions could create risks that would create major disruption to both economic and social activity, resulting in a threat to global human security on a scale equal to the destruction and disruption of the great wars and the economic depression of the early 20th century (Stern Review,2006:vi).

1.1 RESEARCH PROBLEM STATEMENT

Research indicates that climate change will have dramatic effects on the availability of scarce resources, especially in developing countries like South Africa and its neighbouring states. Scholars have since the 1970’s debated the issue of human security and whether the concept should be expanded from the realist perspective to include threats from environmental scarcities.

Debate continues about the possible links between environmental scarcity and violent conflict. It is proposed by some that environmental scarcity leads to migration which in turn results in conflict in the receiving area as further competition over resources develops. Counter arguments maintain that human ingenuity will prevent scarcities from developing through substitution, recycling and innovation. Further schools of thought suggest that scarcity is the result of distribution and political interference and that conflict can be avoided through human willingness to cooperate in the face of scarcity.

Based on the main theories relating to resource scarcity and conflict, this paper will attempt to establish a hypothesis that links climate change and human security in South Africa and its neighbouring states.

1.2 RESEARCH OBJECTIVES

The purpose of this research is to identify, based on the findings of the Stern Review (2006)¹, how human security in South Africa is likely to be affected by the potential conflict resulting from resource scarcities resulting from climate change.

The relevance of this research is the fact that the Stern Review on Climate Change concludes that climate change poses a serious threat to the world and that Africa will be one of the hardest hit continents. Africa is already vulnerable to climate variability and has the least capacity to respond. Due to widespread underdevelopment, conflict, weak states and pervasive poverty, Africa lacks the basic requirements to deal with a threat of this magnitude.

For countries to counteract the impact and implications of climate change The Stern Review (2006) identifies three essential elements: Governance, adaptation skills and mitigation ability (Stern Review, 2006:308-572). These are all skills that are relatively lacking in Africa. Costs of climate change can be reduced through both adaptation and mitigation, but adaptation is the only way to cope with the likely unavoidable, immediate impacts of climate change over the next few decades.

Both national and regional governance is required and African leaders have an important role to play in shaping the international debate. Africa can benefit from global initiatives for clean energy investment, reduced deforestation and development of global public goods, but this will require strong leadership from heads of state and the commitment of all ministries, as the impact of climate change cuts across all parts of government.

¹ Then UK Chancellor of the Exchequer, Gordon Brown, instructed leading economist Sir Nicholas Stern to lead an economic review of the economics of Climate Change. The influential 700-page report was released in October 2006.

Africa has historically been a victim and not a voice. Whereas Africa as a developing continent is not responsible for excessive carbon emissions, it will be one of the worst affected continents. South Africa, as the leading economy in the SADC region, will be affected by the events in neighbouring countries. Food shortages, disease, flooding and poverty north of its borders will have a direct impact on South Africa and will lead to further migration from these territories.

However, on its part South Africa has the responsibility to reduce its own carbon emissions and has the opportunity to use its global political influence to promote a shared understanding of responsible behaviour across all societies. International response to climate change can potentially have a dramatic influence on South Africa and the government should involve itself in the international negotiating process. Active participation will not only create opportunities within existing arrangements, but will also enable South Africa to guide global negotiations towards outcomes that are not only effective, fair and efficient, but that also focus on strategies that will assist South Africa and other developing countries with future governance, adaptation and mitigation measures to manage and lessen the impact of climate change on the most vulnerable population groups. Therefore, in conclusion, possible policies and actions will be identified that could support these objectives.

The leading nations of the world have put Africa on most international agendas, but without urgent, appropriate intervention climate change will undermine any efforts at poverty alleviation, as well as attempts to achieve the Millennium Development Goals; and a crippled African continent will be a threat to world security (Stern Review, 2006:i-xi).

1.3 THEORETICAL FRAMEWORK

The basis of the argument of this thesis is that climate change presents a threat to human security. Ban Ki-moon (2007), Secretary General of the UN, in an address to the General Assembly, likened the dangers of climate change to those posed by a world war to all of humanity (Ban, 2007).

Kaplan (1994:58) states: “It is time to understand ‘the environment’ for what it is: the national security issue of the early twenty-first century”. Kaplan expands his argument by maintaining that factors such as surging populations, spreading disease, deforestation, rising sea levels in

densely populated regions, soil erosion, water scarcity and air pollution will result in mass migration and in turn group-conflict and this will form the core challenge of future foreign policies. Even the United States Pentagon has declared the issue an emerging security threat (Schwarz & Randall, 2003).

The theoretical approach will examine the much debated concept of 'human security' as it has developed since the end of the Cold War. Traditional notions of security were concerned mainly with the state's ability to counter external military threats. Debates on security have since broadened to include a concern with the security of people, making the interests of humanity the focus. This all-encompassing approach to human security implies as a fundamental human right that people should live in freedom, peace and safety, with access to resources and the basic necessities of life in an environment that is not injurious to their well-being.

Conflict resulting from competition over scarce resources could pose a threat to human security and the research tries to analyse the conflict theories of Homer-Dixon (1991, 1994, 1995a, 1996, 1999), Kaplan (1994), Gleditsch (1998), Gleditsch and Theisen (2007) and others who maintain that competition for access to scarce resources is one of the root causes of conflict. A number of analysts have asserted that human-induced environmental pressures may seriously affect national and international security. Concern regarding the impact of climate change on human security has given rise to salient debate on the likely links between environmental change and acute conflict. The modern state centred realist perspective, that is often used to explain security problems, is inadequate for analysing the connections between trans-boundary environmental factors and conflict (Homer-Dixon, 1991:84).

Martin, Blowers and Boersema (2006) focus on only two approaches to environmental conflict studies, namely 'resource curse', or resource abundance, of high value resources such as oil, diamonds, gold, coltan etc., which motivate secessionist conflicts or for instance finance rebel armies and so sustain and fuel existing conflicts. On the other hand they identify 'resource scarcity' as a possible cause of violence. In this context scarcity mainly refers to renewable resources such as food, water, fuel wood and soil, and the scarcity arises due to reduced supply as a result of depletion or degradation, increased demand and /or inequality of distribution (Martin *et al.*, 2006:1-4).

Gleditsch and Theisen (2007) identify four different theoretical approaches to resource scarcity and conflict:

- (i) Neo-Malthusianism: Resource scarcity leads to conflict.
- (ii) Cornucopianism: There is no inherent resource scarcity.
- (iii) Political ecology: The distribution of resources leads to conflict.
- (iv) The liberal argument: Cooperation can overcome Scarcity

(Gleditsch *et al.*, 2007:3-9).

1.3.1 NEO-MALTHUSIANISM

Homer-Dixon (1991) takes a neo-malthusian² approach and focuses on ‘acute’ conflict, which he defines as conflict involving a substantial probability of violence. Heilbroner (1980) maintains that an increase in global environmental damage will increase the disparity between the North and South, and poor nations may militarily confront the rich for a greater share of resources (Heilbroner, 1980: 39). Gleick (as in Homer-Dixon, 1991:77) argues that countries may fight over dwindling supplies of water and the effects of upstream pollution, while Wallenstein (as in Homer Dixon, 1991:76-77) asserts that a sharp drop in food production in developing countries could lead to internal conflict across urban-rural and nomadic-sedentary divisions. Anti-Malthusians argue that human-environmental systems display great resilience, variability and adaptability that will enable developing countries to minimize the negative impacts of environmental degradation (Homer-Dixon, 1991:78).

Neo-malthusians are generally sceptical of human rationality under stressful conditions and the implications for human resource use under stressful conditions. Homer-Dixon (1991) maintains that a growing population, increased consumption and environmental damage will combine to deplete these resources quantitatively and qualitatively and make it increasingly difficult for policymakers in developing countries to intervene and prevent serious social disruption and conflict as their social and political institutions are often fragile (Homer-Dixon, 1991:78-88).

² Neo-malthusianism is derived from Thomas Malthus's theory that population growth is exponential, and agricultural growth arithmetic: therefore population growth will increase at such a rate that eventually there will not be sufficient food for the subsistence of the population see Turchin, P. 2003. ‘Historical Dynamics: Why States Rise and Fall’. Princeton, N.J: Princeton University Press.

Homer-Dixon (1994) identifies three scarcity conflict hypotheses: scarcity of controllable resources will lead to *simple scarcity* conflicts; large population movements will result in *group identity* conflicts; and environmental scarcity will increase economic deprivation, which could cause *deprivation* conflicts (Homer-Dixon, 1994:6).

Homer-Dixon (1991) hypothesizes that many of the environmental threats are causally interrelated and identifies four principal social effects that may, either singly or combined, greatly increase the likelihood of acute conflict in developing countries: decreased agricultural production, economic decline, population displacement, and disruption of legitimate authorities, institutions and social relations. To illustrate the interconnectivity of events he suggests that a decrease in agricultural production could lead to population displacement, which may exacerbate the decline in production. This in turn would lead to economic decline and possibly the flight of individuals with wealth and education, undermining universities, courts of law, economic management structures and eventually the ability to avert the impacts of climate change on the economy (Homer-Dixon, 1991:89-101). Simple scarcity conflicts resulting from environmental scarcity may result in internal or inter-group violence, but are unlikely to cause conflicts between states. Countries that are most dependent on renewable resources are generally relatively poor and therefore unable to finance international aggression (Homer-Dixon, 1994:18-19). It is likely that governments that lack the capacity to adapt to environmental change will also lack the power to prevent conflicting groups from engaging in violence. Government capacity will be an important determinant of the ability of societies to adapt successfully and peacefully to climate change (Salehyan, 2005:8).

1.3.2 CORNUCOPIANISM

The core of cornucopian concern is to question the premise that the availability of natural resources is limited. Although they agree that natural resources are theoretically limited they stress that they are more abundant than neo-malthusians realise, and could be substituted and recycled, or scarcity could be avoided through technological development. Human ingenuity and the market economy are essential elements of cornucopian theory. If scarcity develops to the point that it leads to violent conflict, it would be as a result of political interference (Gleditsch & Theisen, 2007:4).

Cornucopian scholars are more concerned with environmental degradation and economic development than with conflict. Cornucopians maintain that market-driven human ingenuity will always find substitutes of more abundant resources to replace scarcity and that human enterprise will always respond to impending shortages and problems with new and improved measures. They argue that if resources are globally abundant and can be priced, substituted and traded in order to avoid serious scarcities there is no reason why groups should fight over natural resources (Gleditsch & Theisen, 2007:3-5).

Homer-Dixon (1991) challenges this for a number of reasons from a neo-malthusian perspective. In contrast to past experiences we now face multiple serious interactive scarcities that create uncertainties about suitable policy formulation, i.e. an agricultural region may simultaneously be affected by degraded water and soil, climate change-induced precipitation changes, and increased ultraviolet radiation. Resource scarcity historically developed slowly, leaving enough time for innovation and adaptation. Due to an increase in human populations activities are much more resource-intensive, leading to scarcities much more rapidly: whole countries may be deforested in a few decades. In addition the patterns, intensity and sheer volume of consumption have much more momentum than before, as a result of population size. The free-market price mechanism used in cornucopian argument does not reflect true scarcities, especially for resources held in common such as a benign climate and productive seas that in the past seemed endlessly abundant, but are now being depleted. Many societies facing the most serious environmental problems in the near future will be poor, lacking capital and know-how to respond effectively to these threats, as opposed to wealthy countries that have abundant reserves of capital and technological knowledge to make the transition to new production and consumption patterns. Markets and institutions are frequently dysfunctional in the developing world and therefore fail to alleviate scarcities. 'Green' technologies are often too expensive for poor farmers and water is a non-substitutable resource. There is also no reason to believe that humankind will always have the mental capacity to adequately understand and unravel the complexities of environmental-social systems, as environmental degradation often follows a non-linear pattern, making preventative measures difficult to apply, and as science is a slow incremental progress technical solutions to resource scarcity may arrive too late (Homer-Dixon, 1991:101; Gleditsch & Theisen, 2007:5).

Cornucopians view the threat of resource wars as a result of scarcity as highly exaggerated and maintain the only scarcity is 'human ingenuity' (Gleditsch & Theisen, 2007:3-5). They maintain that modern economic and scientific institutions are well-designed to deliver the ingenuity that is needed to adapt to scarcities (Homer-Dixon, 1999:33).

1.3.3 THE ROLE OF INSTITUTIONS – A LIBERAL ARGUMENT AND POLITICAL ECOLOGY

Liberals and political ecologists both focus on the political institutions that govern human behaviour, as opposed to the state of the environment. While the liberals highlight principles of democracy and cooperation, political ecologists emphasise questions of distribution (Gleditsch & Theisen, 2007:7).

Liberal conflict theory rests primarily on two premises, the role of cooperation and the role of democracy, and links up with cornucopian arguments in maintaining that an emerging resource scarcity may encourage cooperation as well as conflict, as two parties may decide it is too costly to fight over a scarce resource, and low-level conflict may serve as a prompt towards cooperation (Wallensteen, 1992:47-54). Liberal argument further points to the significance of democratic systems in resource conflict: famines do not generally occur in democratic states; democracies are likely to promote resource conservation and sound ecological practices; and press freedom will ensure early warning systems of scarcities, which will mobilise innovative countermeasures.

Political ecologists deny any causal link between the scarcity of renewable resources and conflict. Strongly influenced by dependency theory they argue instead that if any scarcity brings about conflict it would be as a result of political interference, distribution and discrimination. Issues of distribution and discrimination are seen as the causes of scarcity and not the actual physical volume or quality of a resource (Gleditsch & Theisen, 2007:8). Political ecologists often align themselves with neo-malthusians in their criticism of cornucopian optimism regarding resource scarcity, but they as often criticise pessimistic arguments as to why conflicts arise. They present useful alternatives in the polarised clash of optimists vs. pessimists on the political framework of environmental change (Hartman, 2001; Hildyard, 1999; Peluso & Watts, 2001).

The Stern Review argues that the impacts of climate change on scarce resources will lead to mass migration and conflict in parts of the developing world. The Review cites an estimate that by 2050 as many as 200 million people may become ‘climate refugees’ as a result of rising sea levels, heavier floods and more extreme droughts (Stern Review, 2006). Gleditsch, Nordas & Salehyan (2007) point out that much of the literature regarding climate change and conflict is speculative as a result of data constraints, and current debates concern ‘possible’ scenarios. They however do believe there is a plausible link between climate change and human security: mass migration. Mass exodus from increasingly uninhabitable regions can place substantial pressure on receiving areas (Gleditsch *et al.*, 2007:4-5).

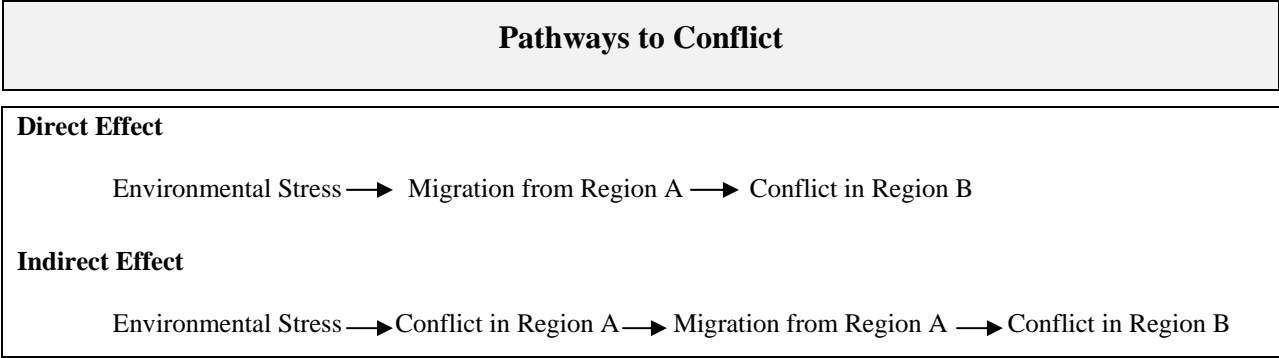


Figure 1: Environmental Stress, Migration, and Conflict: Direct and Indirect Pathways.
(Source: Gleditsch *et al.* 2007)

As indicated in the figure above environmental problems may lead to emigration directly, or it may lead to resource conflicts, which in turn will lead to migration. Both types of migration could lead to conflict in the receiving areas (Gleditsch *et al.*, 2007:6).

Migration challenges affect countries to different degrees. Wealthy states are able to control traffic across their borders more effectively than states with limited resources. Southern European countries are resorting to sophisticated satellites, surveillance planes, naval vessels and border fences to restrict the flow of North African refugees from entering their countries. Countries without these capabilities will have to deal with the resulting challenges once the refugees have settled in their territories (Gleditsch *et al.*, 2007:7).

Homer-Dixon and his colleagues at The Toronto Group³ have published some of the most acknowledged work, which links environmental scarcity with conflict. Homer-Dixon (1991) identifies population size and growth as the key variables producing the environmental resource scarcities. The UN recently estimated that the world population would stabilize at around 11 billion towards the end of the 21st century, which is double the current population. This would require a new generation of agricultural technologies to keep annual food production rising. Genetic engineering may eventually have the solutions to the problems, but the developing world is unlikely to benefit from this on a widespread basis for decades to come. The factors of population growth, consumption, and environmental friction are bound to increase social stresses (Homer-Dixon, 1991:104).

Homer-Dixon (1991) poses the question: What types of conflict will develop if agricultural production drops, poverty increases in developing countries, large numbers of people migrate from their homelands and institutions and social structures are disrupted? As environmental stresses have not yet passed a critical threshold in most developing countries and environment-conflict linkage studies are limited, there is only limited empirical evidence available. Homer-Dixon proposes three theoretical perspectives on conflict – simple scarcity conflicts, group-identity conflicts and relative-deprivation conflicts (Homer-Dixon, 1991:105).

Simple scarcity conflicts are explained by general structural theories and are those conflicts that arise when state actors rationally go for zero-sum gains, such as might arise from resource scarcity. They are often understood in the realist paradigm of international relations theory and may arise over three types of resource scarcity in particular: river water, fish and agricultural productive land. Conflict is most likely to result from these scarcities because the availability is decreasing rapidly in some regions, they are basic to human survival, and they can be seized or controlled (Homer-Dixon, 1991:106-107).

³ The Toronto Group is a North-American research team which has, since its inception in 1990 at the Peace and Conflict Studies Program of the University of Toronto, concentrated their research on scarcities of renewable resources with a focus on finding the links between environmental scarcity and conflict.

Group-identity conflicts are likely to arise from the movements of populations as a result of environmental change. As different ethnic and cultural groups meet under stressful, deprived circumstances, group hostility will arise as a group defends its own identity while discriminating against and threatening outsiders. Martin *et al.* (2006) point out that leaders often manipulate environmental scarcity by encouraging followers to construct environmental issues in terms of existing social cleavages. A society with a history of past conflict renders it more vulnerable to further conflict and makes it easy for leaders to instrumentalise environmental issues to serve their own parochial interests. When population and environmental stresses increase in developing countries, a rise in migration to more developed regions is likely. The ethnic balance in many cities and regions has already been shifted, leading to xenophobia that governments are struggling to contain (Homer-Dixon, 1991:109).

Relative-deprivation conflict theories indicate that as developing societies produce less wealth as a result of environmental pressures their citizens will probably become increasingly dissatisfied with the incremental disparity between economic delivery and their expectations. The faster the deterioration, the greater the discontent will be. The elite are likely to protect their share of the shrinking resource supply, increasing the discontent of the deprived groups. This will sooner or later lead to action against groups that appear to be engineering and benefiting from the unfair distribution of economic goods. This perspective also includes the idea that the arrival of refugees in a region dilutes the distribution of resources, which will lead to a sense of deprivation in the indigenous population that could result in group-identity conflicts if the challenger group has the organizational and leadership capacity (Homer-Dixon 1991:109-110). Salehyan (2005) argues that migrants fleeing from environmental stresses, as opposed to political refugees, are unlikely to contribute to organized violence. Although sustained, the influx takes place over an extended time period, and although sporadic conflict may well arise as a result of competition for jobs and scarce resources, receiving areas are able to adapt over time (Salehyan, 2005:12-14).

To assess the possibility of conflict arising from environmental degradation one cannot rely on generalizations. It requires a multi-faceted understanding of each society's social and institutional structures, its linguistic and ethnic structures, the beliefs about the social good that motivates different groups, the culture of leadership, etc. Homer-Dixon advocates the need to

identify intervening variables – including institutions, technologies and market mechanisms – that may be used to change the course of environmental-social systems. It seems likely that as degradation increases, the size of potential social disruption will increase and opportunities to intervene will rapidly decrease. Developing countries, in conjunction with the developed North, should act without delay to harness the forces behind environmental degradation (Homer-Dixon, 1991:115-116).

1.4 RESEARCH DESIGN AND METHODOLOGY

The research design for this study is of an empirical nature with the units of analysis being states. The research will focus on South Africa as the primary unit of analysis, but the research extends beyond South Africa to include a set of units represented by the states bordering on South Africa. The research combines a set of case studies as they have a direct impact on the prime case.

The nature of the research is descriptive as opposed to explanatory, as it interprets the impact of climate change on scarce resources and the resulting propensity for violence. The study is exploratory in attempting to establish a further hypothesis to explore the pathway from resource scarcity to conflict.

In order to address the research questions, arguments and findings are based on completed case studies and existing data which has been published in the public domain. Although the thesis relies on scientific findings about climate change it does not set out to examine the validity of this body of scientific knowledge, nor are any normative or value judgements made.

As the issue of climate change is of great current interest and debate and is under constant review by politicians, academics, economists and scientists, it is also useful to refer to reports in the media on current statements and recent specialist conclusions to stay abreast of the latest initiatives. This will however not serve as empirical evidence in the development of the argument.

1.5 CONCEPTS

Adaptation is the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2001).

Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC, 2001).

Global warming The term ‘global warming’ is a specific example of the broader term, ‘climate change’. Global warming is the increase in the average temperature of the Earth's near-surface air and oceans in recent decades and its projected continuation (IPCC, 2001).

Human security Literature on the issue of human security has proliferated since the United Nations Development Programme (UNDP) published the Human Development Report in 1994, which contained the most influential conceptualization of ‘human security’ to date. The report also identified the various components of human security. Reference is made to a number of scholars and analysts as consensus is not easily found on exactly what the concept ‘human security’ encompasses. Different members of the human security coalition have defined the concept to suit their own specific interests. According to the government of Japan human security ‘comprehensively covers all the measures that threaten human survival, daily life, and dignity – for example environmental degradation, violations of human rights, trans-national organised crime – and strengthens efforts to confront these threats’ (Paris, 2004:87-102). Jorge Nef (1999) has a fivefold classification scheme: (1) environmental, personal and physical security, (2) economic security, (3) social security, including ‘freedom from discrimination’, and (5) cultural security (Nef, 1999:25).

The most complete recent document on the issue of human security is the ‘Human Security Now’ Report (2003) issued in the Report by the United Nations Commission on Human Security. This report addresses the most prominent human security issues such as poverty, disease and violent conflict which are relevant in the context of African development.

According to the definition of the United Nations Development Program 'human security' means safety from such chronic threats as hunger, disease and repression, plus protection from sudden and hurtful disruptions in the patterns of daily life. To this can be added: protecting vital freedoms, protecting people from critical and pervasive threats and situations, building on their strengths and aspirations and creating systems that ensure survival, dignity and livelihood. In order to do this it offers people protection against danger and empowers them, to enable them to develop their potential and become full participants in decision-making (Human Security Now, 2003).

Mitigation of climate change involves taking actions aimed at reducing the extent of global warming, in contrast to adaptation which involves actions to minimize the effects of global warming, (IPCC, 2001).

Scarce resources in this context refers mainly to renewable resources such as water, fuel wood, food and soil, and arises due to reduced supply (depletion or degradation), increased demand and/or increasing inequality of distribution (Martin *et al.*, 2006:1).

1.6 LIMITATIONS AND DELIMITATIONS OF RESEARCH

As this thesis is a social sciences research project the objective of this thesis is not to challenge the scientific findings on the causes or validity of climate change. The departure point is that climate change is a scientific reality and that it will have a dramatic impact on the African continent.

The Stern Review on the Economics of Climate Change (2006) has been selected as the scientific framework to examine the hypothesis that climate change poses a serious threat to scarce resources and human security in South Africa. Extensive reference will be made to the findings and recommendations of internationally recognized bodies, conventions and treaties, as the Stern Review based their economic recommendations on the scientific findings of recognised experts in the science of climate change.

The impact studies of climate change will be limited to the scientific findings as at the date of publication of the Stern Review on 30 October 2006. As the theoretical framework focuses on the effect of climate change on scarce resources, the research analysis will be limited to these

resources and exclude all other impacts that are not relevant. Climate change research and statistics are limited in Africa, as it is costly to conduct, requires scientific expertise which Africa lacks, and there is little if any infrastructure to support such research in the rural areas where the majority of people live. Where reliable data does exist, it is generally related to expansive continental land masses, as opposed to local/regional areas, and generalised scientific deductions have to be derived.

The geographical delimitations of the thesis are South Africa and neighbouring territories, as the scope of the thesis cannot accommodate more extensive research. The impact of climate change on neighbouring countries is only included in the research when it is likely to have a negative impact on the availability of scarce resources and pose future threats to human security in South Africa.

Empirical evidence can only be based on events or patterns of behaviour that have already occurred. Much of the debate around climate change concerns future forecasts and possible scenarios. It is most likely that the most extreme effects of climate change will occur sometime in the future, therefore recommendations for adaptation, mitigation and future policies can only be based on an analysis of best and worst case scenarios and firm theoretical foundations (Gleditsch *et al.*, 2007:7).

1.7 LITERATURE REVIEW

To research the issue of whether climate change will have a negative impact on scarce resources and lead to conflict that will undermine human security one would need to review propositions from the environmental security literature, in order to establish possible links between environmental scarcity and violent conflict (Kaplan, 1994; Percival & Homer-Dixon, 1998; Schwarz & Randall, 2003; Raleigh & Urdal, 2005). The theoretical framework is based on peer reviewed articles on the concept of human security and on environmental or resource scarcity as a root cause of conflict and therefore a threat to human security.

The focus of the research is not literature debating the existence of climate change. The departure point is the hypothesis that climate change represents a very real threat to the world and to Africa in particular. The aim is therefore to identify hypotheses regarding the impacts of climate change

on areas relevant to the de-limitations of the study. Although reference is made to articles in the popular media, information is mainly taken from official documents and websites of the various protocols, conventions and government policy statements.

The Stern Review (2006) is used as a framework for analysis and recommendations, due to the wide ranging approval it has received from renowned economists, scientists, environmentalists and world leaders. Reference is also made to critical responses to the findings of the Stern Review. Other primary sources that are referenced are among others the Kyoto Protocol, the Intergovernmental Panel on Climate Change (IPCC), and the United Nations Framework Convention on Climate Change (UNFCCC).

Literature on the issue of human security has proliferated since the United Nations Development Programme (UNDP) published the Human Development Report in 1994, which at the time contained the most influential conceptualization of 'human security'. The report also identified the various components of human security. Reference is made to a number of scholars and analysts as consensus is not easily found on exactly what the concept 'human security' encompasses. The most complete recent document on the issue of human security is the 'Human Security Now' (2003) report issued in the Report by the United Nations Commission on Human Security. This report addresses the most prominent human security issues such as poverty, disease and violent conflict which are relevant in the context of African development (Human Security Now, 2003).

The environment, population and conflict theory remains central to current environment and security debates. Multiple articles by Thomas Homer-Dixon form the basis of the conflict theory that competition over scarce resources is one of the root causes of conflict. This theory is tested and verified against the writings of scholars like Midlarsky (1998), Diamond (2005), Kaplan (1994) and Gleditsch (1998), to mention the most relevant literature concerning this claim.

1.8 OUTLINE OF REMAINING CHAPTERS

The remainder of this study has been divided into five chapters.

CHAPTER 2 gives a background to the Stern Review on the Economics of Climate Change and a brief explanation of climate change. It continues with an overview of the general impacts

climate change will have on global scarce resources. The final section of this chapter explores stabilisation, mitigation, adaptation and governance as actions to deal with the consequences of climate change.

CHAPTER 3 identifies the various scarce resources that will be affected by climate change in South Africa as well as in neighbouring countries.

CHAPTER 4 analyses the potential conflict that could arise from the competition over access to limited life sustaining resources and the impact this will have on human security and to propose an hypothesis regarding the fuelling effect of xenophobia on scarcity induced conflict.

CHAPTER 5 analyses the response of the South African Government to the findings of the Stern Review, as well as an investigation into other initiatives and interventions to lessen the negative impacts of climate change on human security in South Africa.

To conclude, some recommendations are put forward for domestic actions and policies as well as proposals for international cooperation and interventions, to alleviate the severity of the threat to human security in South Africa. As pointed out in the Stern Review, all is not lost and, although certain risks can no longer be avoided, the worst case scenarios can be prevented by means of regional and global urgent adaptation and mitigation measures, and determined governance.

CHAPTER 2

THE STERN REVIEW: THE ECONOMICS OF CLIMATE CHANGE

2.1 BACKGROUND

Global climate change is possibly the greatest environmental challenge facing the world this century. Several concerned governments came together in 1988 and formed the Intergovernmental Panel on Climate Change (IPCC), which resulted in the United Nations Framework Convention on Climate Change (UNFCCC), which was tabled in 1992 at the United Nations Conference on Environment and Development. The official goal of the UNFCCC is to achieve stabilization of the concentrations of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system (S.A. National Climate Change Response Strategy, 2004).

It soon became apparent that the parameters set out by the UNFCCC were inadequate and this in turn led to the adoption of the Kyoto Protocol in 1997, after much international negotiation. The Protocol was opened for signature in March 1998 and eventually entered into force in February 2005. As of December 2006 a total of 169 countries and other governmental entities had ratified the agreement, with the notable exceptions of the United States and Australia. As opposed to developed, or Annex 1 countries, developing countries like India, China and South Africa, or non-Annex 1 countries, although they have ratified the protocol, are not required to reduce carbon emissions under the present agreement. Annex 1 countries are expected to reduce their collective emissions of greenhouse gases by 5.2%, compared to 1990 levels, calculated as an average over the five-year period 2008-2012 (Kyoto Protocol, 2005).

Many countries are struggling to achieve even the modest targets set by Kyoto for 2012. The Canadian government has openly conceded failure and the UK, as one of the most committed protagonists, had to suffer the embarrassment of rising emissions.

It is against this backdrop of growing concern that then Chancellor of the Exchequer, Gordon Brown announced that he had instructed Sir Nicholas Stern to lead a major review of the

economics of climate change, to gain a more comprehensive understanding of the economic challenges and how they can be met, in the UK and globally (Stern Review, 2006).

The 700-page report, released on 30 October, 2006 was one of many previous economic reports on climate change , but it is significant as the most far reaching and most widely discussed report of its kind, having attracted a great deal of positive attention. Although the Stern Review focuses on the economics of climate change it has been selected as a scientific framework for this paper, based on the worldwide recognition it has received in academic, scientific and political arenas.

As with all contentious issues, the Stern Review has had its detractors, but the central issues in critical debates have concerned the discounting procedures used to evaluate flows of costs and benefits occurring in the future, as opposed to the scientific findings on the environmental and social impacts of climate change.

Apart from support from leading economists worldwide, global leaders, academics and scientists have come out in praise of the findings and recommendations. Tony Blair stated that the Stern Review demonstrated that scientific evidence of global warming was ‘overwhelming’ and its consequences ‘disastrous’ if the world failed to act (Climate Change fight... , 2006). Australian Prime Minister, John Howard, responded by announcing that AU\$60 million would be allotted to projects to help cut greenhouse gas emissions while reiterating that Australia would not ratify the Kyoto Protocol (\$60 to help cut...., 2006).

Prof. Jeffrey Sachs, Director of the Earth Institute at Columbia University and Special Advisor to the then UN Secretary General Kofi Annan, added his support for the Review by saying it ‘is a vital step forward in securing an effective global policy on climate change’ and that ‘The Stern Review will play an important role in helping the world agree on a sensible post-Kyoto policy’. (HM Treasury, 2007).

2.2 UNDERSTANDING CLIMATE CHANGE

Human induced climate change is caused by the emissions of carbon dioxide and other greenhouse gases (GHGs)⁴ that have accumulated in the atmosphere mainly over the past 100 years, and scientific evidence that climate change poses a serious and urgent global threat is now compelling. It is a global issue that requires a global response. It is clearly a global collective problem that warrants international cooperation and leadership to reduce the risk of very damaging and potentially irreversible impacts on ecosystems, societies and economies. The UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol provide a basis for international co-operation, but more ambitious action is now necessary (Stern Review, 2006: viii).

The Stern Review (2006) assessed a wide range of evidence on the impacts and economic costs of climate change, which led to the conclusion that the benefits of determined, timely action far outweigh the economic costs of not acting. The results indicate that with a ‘business-as-usual’ approach the overall costs and risks of climate change will equal at least 5% and up to 20% of global GDP each year from now on. Taking responsible action – dramatically reducing greenhouse gas emissions to avoid the worst impacts of climate change – can limit costs to approximately 1% of global annual GDP (Stern Review, 2006:vi). Even if rich countries take responsibility to reduce emissions by 60-80% by 2050, developing countries will have to take meaningful action as well. These measures need not cap development and growth aspirations in rich or poor countries.

In a bold statement the Stern Review (2006) states: “Climate change is the greatest market failure the world has ever seen...” (Stern Review, 2006: viii).

⁴ Greenhouse gases (GHGs) are components of the atmosphere that contribute to the greenhouse effect or global warming. Some GHGs occur naturally in the atmosphere, while others result from human activities such as burning of fossil fuel and coal. GHGs include water vapour, carbon dioxide, methane, nitrous oxide and ozone. (Hayhew, S. The Oxford Dictionary of Geography, 3rd edition, Oxford University Press, 2004). Once in the atmosphere some GHGs remain there for hundreds of years. The greenhouse effect is a natural process that keeps the earth’s surface around 30° warmer than it would be – carbon dioxide and water vapour create a heat-trapping effect – without which the earth would be too cold to support life (Stern Review, 2006:7).

Failing to act would result in greenhouse gases in the atmosphere reaching double the pre-industrial level as early as 2035, virtually committing the world to a global temperature rise of more than 2°C, with a 50% chance of a rise exceeding 5°C - a rise equivalent to the difference between current temperatures and the ice age (Stern Review, 2006: vi). Near the middle of this range of warming would expose the earth to a level of warming on a global scale that is far outside the experience of human civilisation. Climate change projections must also take into account that climate change itself may exacerbate future warming by reducing natural absorption and releasing stores of carbon dioxide and methane. These feedbacks are not included in most climate projections as their effects are only recently being understood, but preliminary estimates indicate that this could increase warming by 0.1°C - 1.5°C by 2100 (Stern Review, 2006:10).

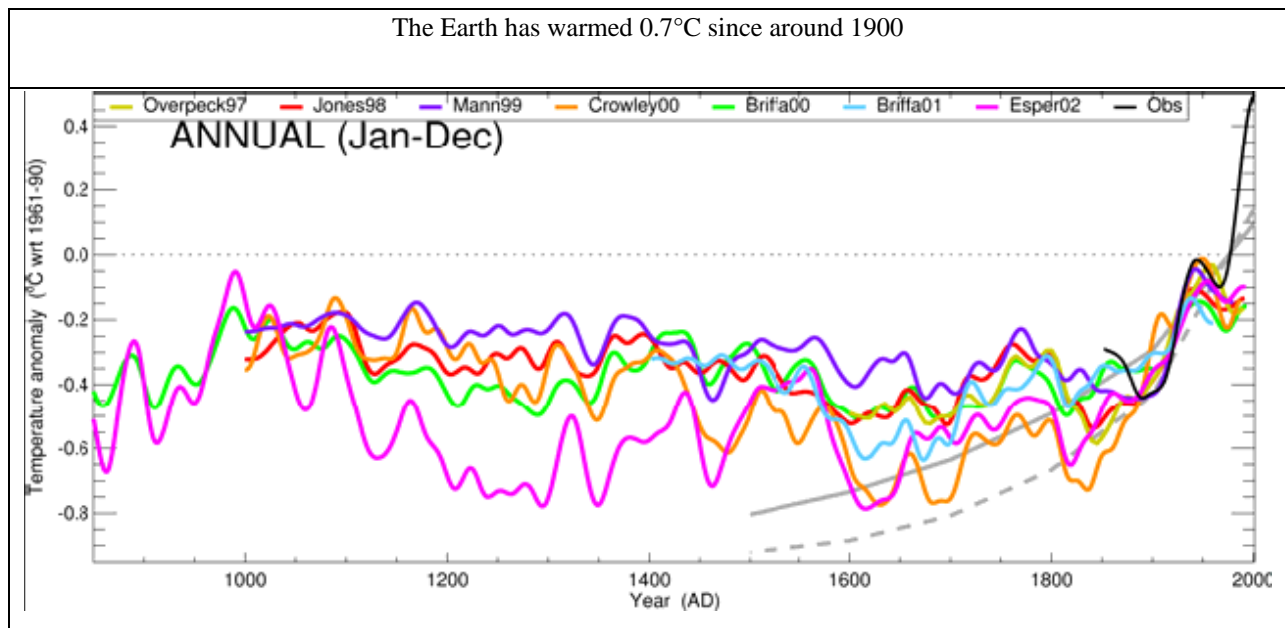


Figure 2: Global Average Near-Surface Temperatures 1850-2005

(Source: Stern Review, 2006:5)

This will have very serious impacts on world output, on human life and on the environment. All countries will be affected, but the most vulnerable – the poorest countries and populations – will be affected first and most, even though they have contributed least to the causes of climate change. The costs of climate change as a result of extreme weather, floods, droughts and storms are already affecting even wealthy, developed countries.

It is no longer possible to prevent the climate change that will take place over the next 20 to 30 years, but adaptive measures can protect societies and economies to a certain extent. These measures will cost billions of dollars annually, especially in developing countries where scarce resources are already under pressure. The risks of the worst impacts of climate change can be substantially reduced if greenhouse gas emissions can be stabilized at a level 25% below current levels by 2050⁵. Much of the debate over the attribution of climate change has now been settled as new evidence has emerged to clarify contentious issues. It is now widely accepted that, while natural factors such as changes in solar intensity and volcanic activity can largely explain global temperature fluctuations in the early 19th century, rising GHG levels provide the only acceptable explanation for the past 50 years.

Human-induced climate change is at its most basic level an externality, in that those who produce the GHG emissions are causing climate change, but they will not directly bear the full consequences of the costs of their actions. Although climate change will have serious impacts on the lives of most of those alive today, future generations will be most severely affected, while they have no representation in present-day decisions (Stern Review, 2006:23). The full costs of GHG emissions are unlikely ever to be borne by the emitter, so they face little economic or other incentive to reduce emissions, unless policy intervenes.

The Stern Review (2006) draws attention to the ethical aspects of climate change which connects with the concept of human security. Impacts of climate change on future generations and other nations raise questions of rights and protection from harm done by others. Looking at the moral responsibilities of the current generation many would maintain that it is the right of future generations to enjoy a world whose climate has not been transformed by human action that makes human life that much more difficult. Future generations should have a right to a standard of living no lower than the current one and the global environment and ecological system that provide humans with basic life support systems cannot be sacrificed or substituted (Stern Review, 2006:42).

⁵ GHG levels in the atmosphere need to be stabilized between 450 and 550ppm CO² equivalent (CO²e). The current level is 430ppm CO²e and it is rising at more than 2ppm each year. See also IPCC TAR range (Stern Review, p.12).

2.3 IMPACTS OF CLIMATE CHANGE ON SCARCE RESOURCES.

‘Climate change threatens the basic elements of life for people around the world – access to water, food, health, and use of land and the environment’ (Stern Review, 2006:56).

The Stern Review (2006) identifies a wide range of severe impacts as a result of human induced climate change that will threaten human security around the globe. The scope of this research is however limited to the impact on those resources that are defined as ‘scarce resources’ and where scarcity is likely to lead to conflict and a resulting threat to human security. Analysis will therefore be limited to findings relevant to these limitations.

2.3.1 WATER RESOURCES

Around the world people will experience the impact of climate change most strongly through changes in the distribution of water and its seasonal and annual variability. Not only is water an essential resource for all life, it is also a critical requirement for most production and poverty alleviation and sustainable growth.

Globally approximately 70% of all freshwater is used for crop irrigation and food production, 22% for manufacturing and energy and only 8% is used by households for drinking, sanitation and recreation (Stern Review, 2006:62).

Climate change will intensify current water cycles. Droughts and floods will become more severe in many regions, while there will be more rain at high altitudes, less rain in the dry sub-tropics and uncertain, but probably intense changes in tropical areas. Areas that are already quite dry, such as the Mediterranean and parts of Southern Africa and South America, are likely to experience decreases of up to 30% in annual runoff in these areas for a 2°C global temperature rise and 40-50% for 4°C.⁶ In contrast South Asia, parts of Northern Europe and Russia are likely to experience an increased run-off which could lead to more frequent floods. In already dry regions a 3°C rise in global temperatures could result in extreme droughts every 10 years instead of every 100 years (Stern Review, 2006:62)

⁶ Runoff is the amount of water that runs over the land surface. (Arnell,2006a)

About one-third of today's global population experience moderate to high water stress⁷ and 1.1 billion people do not have access to safe water. The effects of rising temperatures combined with growing populations are likely to cause dramatic changes in the water status of billions of people. According to some estimates a rise of 2°C will result in 1-4 billion people experiencing water shortages, mainly in Africa, the Middle East, Southern Europe, and parts of South and Central America, where water management is already a crucial factor for growth and development (Stern Review, 2006: 63). Changes in the water cycle will also have serious implications for health. Droughts and floods are harbingers of disease as well as causing death from dehydration or drowning. Prolonged droughts increase the likelihood of forest fires that release respiratory pollutants, while floods facilitate the growth of infectious fungal spores, creates new breeding ground for vectors such as malaria, and results in outbreaks of water- borne diseases like cholera.

Climate change will have dramatic consequences for people who depend on glacier melt-water during dry seasons. In India melt-water feeds 70% of the summer flow in the Ganges, which supplies water to around 500 million people and in China 250 million people live in the western region that depends on glacier melt-water. In the tropical Andes in South America, the area covered by glaciers has receded by nearly 25% and some small glaciers are likely to disappear completely in the next decade (Stern Review, 2006:63).

Rising sea levels will result in hundreds of millions more people being flooded each year with a rise in temperature of 3 or 4°C. Melting or collapse of ice sheets would raise sea levels and ultimately flood at least 4 million km² of land, which currently accommodates 5% of the world's population. Areas under threat that will require intense coastal protection include Bangladesh and Vietnam, islands in the Caribbean and Pacific, and major cities like Tokyo, Shanghai, Hong Kong, Mumbai, Calcutta, New York, Miami and London.

⁷ Water stress is a useful indicator of water availability but not necessarily indicate access to safe water. A country experiences water scarcity or 'extreme water stress' when supply is below 1000m³ per person per year and absolute water scarcity or 'severe water stress' when supply is below 500m³ (Prepared by Prof. N. Arnell , Tyndall Centre and University of South Hampton).

2.3.2 FOOD RESOURCES

Food production will be particularly sensitive to climate change, as crop yields are in large part affected by temperature and rainfall patterns. Agriculture presently represents 24% of world output, employs 22% of the world's population and covers 40% of the land mass. The importance of agriculture is further illustrated by the fact that 75% of the world's poorest people (the 1 billion who live on less than \$1 a day) live in rural areas and depend on agriculture for their survival (Stern Review, 2006:67).

Around 800 million people are currently at risk of hunger and malnutrition causes the death of around 4 million people per annum, almost half in Africa, where the declines in yields will be greatest, the dependence on agriculture is highest and purchasing power lowest.

Low levels of warming could increase crop yields in mid to high latitudes by extending the growing season, opening new areas for cultivation or making it possible to cultivate new crops. However excessive warming and water shortages can reduce yields by half if they coincide with critical phases in the crop cycle, like flowering.

The impact of climate change on crop production depends greatly on the size of the 'carbon fertilization' effect⁸, but clear empirical evidence is still limited. While agriculture in high altitude regions is likely to benefit from moderate warming, even marginal shifts in tropical regions will lead to declines in yields, as crops are already close to critical temperature thresholds⁹ and many countries have limited capacity to make economy-wide adjustment to farming practices. Africa, Western Asia and the Middle East will be worst affected where yields of the most important regional crops will decline from 15-35% for rises between 2-4°C. Maize-based agriculture in parts of Africa and central-America is likely to decline substantially, as

⁸ Carbon dioxide is a basic building block for plant growth. Rising concentrations in the atmosphere may increase the initial benefits of warming. Clear empirical evidence is still limited, although initial research indicates that yields of several cereals (esp. wheat and rice) will increase for 2-3°C of warming, but then decline, recent crop models indicate a global cereal production decline of 5% for a 2°C rise, and that at 4°C rise entire regions, i.e. parts of Australia, will be too hot and dry to grow crops.

⁹ The optimum temperature for crop growth is around 25-30°C while around 40°C is usually lethal.

maize is less responsive to the beneficial effects of rising carbon dioxide¹⁰ (Stern Review, 2006:67).

The impact of climate change on food production will largely depend on the degree of adaptation, which will be determined by access to funding, market structure, and types of farming (i.e. rain-fed or irrigated crops). Researchers place great faith in the positive impact of higher temperatures on yields and cultivation at higher altitudes, but they fail to recognize the costs involved with such transitions as well as the disruptive effect of population migration to these regions. The effects of short term events such as floods, droughts and heat waves have not been taken into account in existing estimates, and are likely to have further negative effects on production.

Most importantly, the expansion of agricultural land at the expense of natural vegetation may affect local climates negatively, as tropical deforestation would lead to rainfall reduction because of less moisture being returned to the atmosphere (Stern Review, 2006:68).

Although about 1 billion people worldwide rely on fish as their primary source of animal protein, information on the impact of climate change on fisheries is very limited. Ocean acidification¹¹ is likely to be particularly damaging, due to chemical changes caused by increasing amounts of carbon dioxide dissolving in sea water. The rate of current increases in acidity levels have not been experienced for hundreds of thousands of years, and ocean acidity makes it more difficult for many ocean creatures to form shells and skeletons from calcium carbonate. Such chemical changes have the potential to seriously disrupt marine ecosystems and irreversibly damage the food chain (Stern Review, 2006:72).

2.3.3 LAND FOR HABITATION AND AGRICULTURE

Land available for habitation and agriculture will be dramatically reduced for many centuries to come as a result of warming from the last century, which has resulted in sea level rise, more

¹⁰ Other staple crops in Africa, like millet and sorghum, are also less responsive to the carbon fertilization effect, although they show a small positive response as they require less water to grow.

¹¹ Turley et al.(2006) – Ocean pH has changed by 0.1pH unit over the last 200yrs. As pH is on a log scale, this corresponds to a 30% increase in the hydrogen ion concentration, the main component of acidity.

frequent floods and increased droughts. Estimates suggest that 150-200 million people may be permanently uprooted by the middle of the century as a result of these impacts (Stern Review, 2006:76-77).

The homes of tens of millions of people will be lost to flooding from coastal storms, especially people in South and East Asia, on small islands and those living on the coast of Africa. Coastal areas are of the most densely populated areas in the world and they support several important ecosystems on which local communities depend for survival. In addition, vital infrastructure is often strategically located along the coast, including oil refineries, nuclear power plants, harbours and industrial developments.

As temperatures rise, the world risks crossing a threshold level of warming, beyond which melting of the polar ice sheets would be unavoidable. This would lead to a sea level rise of 5 to 12 meters over coming centuries. Currently approximately 270 million people would be displaced by a 5 metre rise and regions like South and East Asia could lose 15% of their land mass (Stern Review, 2006:81).

2.3.4 CONCLUSION

A warmer world with a more intense water cycle and rising sea levels will affect many crucial elements of wealth and well-being, such as water supply, food production, health and availability of land. Although some changes are difficult to predict precisely as modelling efforts are still limited, they do provide a meaningful measure for a comprehensive assessment of the impacts of climate change. What matters is the magnitude of the different risks for different people.

The poorest will be affected earliest and most severely. The human consequences will be most devastating and widespread in Sub-Saharan Africa, where millions more will succumb to malnutrition, malaria, and disease unless dramatic measures are taken (Stern Review, 2006:84).

2.4 COMBATING CLIMATE CHANGE

2.4.1 THE CHALLENGE OF STABILISATION

As a result of past emissions the world is already irreversibly subjected to further climate changes. Global temperatures and the severity of resulting negative impacts will continue to

increase unless the stock of GHG's is stabilized. Urgent intervention is necessary to prevent further temperature rises and consequences that could seriously threaten human security worldwide. Stabilisation requires a global effort to reduce GHG emissions to a level that balances the earth's natural capacity to absorb GHG's from the atmosphere. The future of natural carbon absorption capacity is uncertain, as it depends on a number of factors such as: the sensitivity of carbon absorbing systems, like forests, to future climate changes; human actions such as deforestation for agriculture; the sensitivity of natural processes to the rate of increase and level of carbon dioxide in the atmosphere (the carbon fertilisation effect).

Land use management, such as afforestation and reforestation can be utilised to increase natural absorption. This can only form one part of a mitigation strategy that will require much more extensive emissions reduction from many sectors to ultimately cut emissions to less than 20% of current levels (Stern Review, 2006:196-199). Stabilisation of GHG's in the required range of 450-550 ppm CO₂e will require dedicated action from developed as well as developing regions.

Stabilising GHG emissions is possible through implementing a portfolio of options across multiple sectors. The policy choices are complex, the cost implications vary, and there are also associated environmental and social impacts and limitations (Stern Review, 2006:208).

2.4.2 POLICY RESPONSES FOR MITIGATION

Effective action to combat climate change requires a dramatic shift to new or advanced technology in important sectors such as power generation, transport, energy use and agriculture. The private sector plays the most important role in research and development (R&D) and technology diffusion, but close cooperation between government and industry could generate the development of a wide portfolio of low carbon technologies and help reduce costs (Stern Review, 2006:347).

In the short term price-driven mechanisms will facilitate flexibility in how, where and when emission reductions are made, and create opportunities and incentives to keep the cost of

mitigation down. The Kyoto Protocol established intergovernmental emissions trading¹² to enable countries to meet their emissions reduction targets. The aim would be to ensure that those countries generating GHG's face a marginal cost of emissions that reflects the damage they cause. Emitters are hereby encouraged to develop alternative, low-carbon technologies while consumers should amend their pattern of spending on GHG-intensive products and services in response to relative price increases (Stern Review, 2006: 324).

Carbon pricing is only one part of a strategy to address climate change, and it needs to be supported by the development of technology and measures that will lead to behavioural change, particularly around take-up of energy efficiency. At a global level heavy industry (such as iron and steel, cement, paper and aluminium industries and chemical and petrochemicals) are large emitters and as they are normally committed to long term capital infrastructure investment these sectors are likely to be very sensitive to carbon pricing.

Although road transport emissions are generated by a vast number of private and independent commercial vehicles, it is possible to use emissions trading in this sector as well through a number of approaches, depending to whom the permits are allocated. Aviation, however, presents some difficult challenges, due to the international nature of the industry and the fuel taxation rules of the International Civil Aviation Organisation. International shipping faces similar complexities. A lack of international cooperation could lead to serious carbon leakage issues as the aviation industry is responsible for major contributions to global warming (Stern Review, 2006:342).

Agricultural emissions come from a conglomerate of small farming entities, of which 75% are in developing and transition economies. Emissions depend on the type of farming and the methods employed as well as the local environmental conditions. Many countries have introduced regulation of agricultural practices such as the use of water for growing rice, the quantity and

¹² Emissions/carbon trading is the term applied to the trading of certificates presenting various ways in which carbon-related emissions reduction targets might be met. Participants buy and sell contractual commitments or certificates that represent specified amounts of carbon-related emissions, because it is the most cost effective way to achieve overall reduction in the level of emissions. Entities that have achieved their own emission reduction target will easily be able to create emission reduction certificates surplus to their own requirements to enable countries to meet their emissions reduction target (State of New South Wales, 2005).

types of fertilisers that are used and the treatment of manure. Developing countries find it difficult to enforce regulations as they lack the infrastructure and resources needed to monitor the implementation of these regulations.

Environmental innovation¹³ is essential in reducing the prohibitive costs of technologies. As carbon pricing is still in the early stages of development and uncertainties remain over the long term durability of the signal. A robust expectation of carbon prices in the long term is necessary to generate large investments in the development of low-carbon technologies. Without appropriate incentives private enterprise and capital markets will be less inclined to invest in the development of low-carbon technologies. Existing infrastructure (i.e. electricity grids), lack of competition and government regulation will often lead to low levels of innovation as there is less pressure to stay ahead of competitors and the regulator may limit the firms' ability to maximise the benefits from the successful innovative investments (Stern Review, 2006:352).

Innovation is, by its nature, unpredictable and some technologies will succeed while others will fail. Supporting the development of low-emission technologies should form an important element of climate policy. The government's role should be to directly fund skills and basic knowledge creation for science and technology, and to provide a clear policy framework to drive private-sector investment. Uncertainties with regard to technology development will not be reduced exogenously but endogenously through investment and the feedback and experience gained (Stern Review, 2006:360).

Individual preferences play an important part in shaping behaviour and demand for goods and services that have an impact on the environment. Public policy on climate change should inform people on responsible behaviour. Education on the risks, costs, and benefits, combined with effective leadership by governments, businesses, investors, communities and individuals on the importance of mitigation is crucial (Stern Review, 2006:398).

¹³ Environmental innovation can be defined as innovation that occurs in environmental technologies or processes that either control pollutant emissions or alter the production processes to reduce or prevent emissions (Anderson et al, 2001).

2.4.3 POLICY RESPONSES FOR ADAPTATION

The long term impacts and costs of climate change can be reduced through both adaptation and mitigation, but adaptation is the only way to deal with the impacts of climate change over the next few decades. Adaptation is different to mitigation in two key aspects: It mostly provides local benefits and these benefits can materialise relatively quickly. There are however many barriers to effective adaptation such as poverty driven low adaptive capacity and market failures like incomplete information (Stern Review, 2006:554).

Households and communities respond independently to climate change impacts and sudden extreme variability in ways that reduce the harmful effects, but these efforts fall far short of what is required in the face of current weaknesses and the extent of future impacts. They will require the support of their respective governments to surmount obstacles and increase adaptive capacity. Developing countries are expected to suffer most and soonest from climate change, but government capacity is also lacking in most developing countries where human and other resources are already at a premium. Development is the most effective way to promote adaptation to climate change, because it strengthens resilience and lessens vulnerabilities. Therefore much of what governments should be doing to combat climate change is what they should be prioritising in any event – implementing good development practice. Empowering individuals and communities through development will better equip them to adapt to climate change. In some instances costs could be prohibitive and here the international community should assist with finance, considering the income disparities and the historical responsibility for the bulk of past emissions. Economic diversification for instance is a core feature of development and it reduces the dependence of the economy and households on climate sensitive sectors such as agriculture (Stern Review, 2006:432).

Natural disasters have a far greater impact on developing than developed countries, and improving disaster preparedness and management not only saves lives, but also supports cost-effective adaptation to climate change threats.

Risk-based insurance schemes can also lessen the costs of climate change impacts, but these insurance markets do not always emerge in developing markets as a result of underdeveloped financial markets, low income levels and a lack of specialised information. While approximately

33% of natural-disaster losses are insured in the developed world only 3% are insured in developing countries (Stern Review, 2006:433-435).

Beyond reducing vulnerability through a broad range of development activities, investing in climate resilience also has implications for a country's investment in technological, human, physical, social and natural capital. Governments can improve the transfer of information about climate resilient crop varieties and irrigation schemes, and they can invest more in health and education to raise the effectiveness of informing people about the impacts of climate change on their daily lives and how they should adapt their behaviour. Governments can ensure that long-term infrastructure is climate resilient and environmentally friendly through building regulations, land-use zoning and the installation of flood barriers and sea walls. Supportive social networks will also be less effective as a result of the destructive impacts extreme climate events could have on families and households in an entire region, and these will be in need of government support. In order to assist impoverished people governments can also protect the resilience of natural systems such as planting mangrove belts to fend against coastal erosion due to sea level rise (Stern Review, 2006:437).

The climate will continue to change over the next few decades, regardless of mitigation measures. Adaptation costs will continue to rise exponentially if efforts to mitigate emissions are not successful and those who will be affected most immediately and most severely will be those who can least afford it and who contributed little to the problem. In light of the extensive implications of climate change governments should integrate climate change adaptation measures into all their development projects, as development progress will be the most effective measure to help counteract the negative impacts of climate change (Stern Review, 2006:443).

2.4.4 INTERNATIONAL COLLECTIVE ACTION

Just as individuals and firms in developing countries will need help from their governments to adapt to climate change, so these governments may need the support of the international community. Given that the most affected countries are often amongst the poorest, the

international community needs to honour the commitments made at Monterrey in 2002¹⁴ and at the G8¹⁵ summit in Gleneagles in July 2005, to increase aid to developing countries.

Four broad issues are identified that will require international collective action: improving and honouring international commitments to assistance for development, and specifically adaptation to climate change; acknowledging the importance of private funding for adaptation measures; promoting global public goods; and increasing international support for disaster risk reduction. Meeting the Millennium Development Goals already requires extensive international support, and climate change and the need for adaptation will pose an additional challenge for countries' growth and poverty reduction efforts. The international community should recognise the importance of mitigation, as without effective early intervention the costs of adaptation will rise and additional financial resources will be needed (Stern Review, 2006:555-558).

2.5 CONCLUSION

Lessening the vulnerability of poor people in developing countries to the negative impacts of climate change and climate variability should be the focus of adaptation efforts, as poverty limits peoples' ability to cope with challenges and disasters, especially when combined with other stresses such as disease, land degradation, weak institutions, governance challenges and conflict. If the international community is to achieve its development goals as defined by the Millennium Developments Goals it is essential that they honour commitments made at various international forums. Mainstreaming climate change objectives into development priorities will help ensure constancy between adaptation measures to combat negative impacts of climate change, while achieving the goals set out for growth and poverty reduction (Stern Review, 2006:567-568).

¹⁴ Approximately 50 world leaders met in Mexico in March 2002 at the United Nations sponsored Monterrey Summit to address the issue of poverty. The UN has set a goal of cutting world poverty in half by 2015 and the summit was to focus on how to achieve this (Online Newshour,2002).

¹⁵ The comprehensive package agreed to at Gleneagles will mean faster progress toward meeting the Millennium Development goals which include targets on eradicating extreme poverty, combating HIV and Aids and malaria, and ensuring that every child receives primary education (Africa G8 Gleneagles, 2005).

CHAPTER 3

THE IMPACT OF CLIMATE CHANGE ON SCARCE RESOURCES

3.1 INTRODUCTION

Southern Africa is one of the regions estimated to be most at risk from climate change. Africa is home to 14% of the world's population but creates only 3.2% of its carbon emissions. Few doubt that climate change is exacerbating problems in Africa. (Action Aid, 2006:2).

Southern African countries are at risk economically, socially and environmentally. The vast majority of their people rely on agriculture for their survival, which is being threatened by climate change. At the moment sub-Saharan Africa has 200 million under-nourished people. A cause of great concern is countries like Mozambique and South Africa that will substantially lose agricultural potential due to climate change (Shah¹⁶, 2003). Most small-scale farmers in southern African countries have historically been able to adapt to normal climatic variability with indigenous practices, but the repeated droughts and floods have affected the traditional systems and severely challenged farmers' adaptive skills. Climate change is just adding another huge stressor in situations where the poor are already contending with problems including poverty and unequal access to resources, weak institutions, food insecurity, disease and conflicts (Beckett, 2007 a).

3.2 IMPACT ON SCARCE RESOURCES IN SOUTH AFRICA

South Africa agrees with the United Nations Security Council (UNSC) that the effects of climate change are already grave and are growing. The UNSC has noted that Arctic warming is progressing at a rate twice as fast as the global average, and that the resulting melting is threatening low-lying regions and coastal cities half a world away. And for one third of the world's population living in dry lands, especially those in Africa, this will aggravate desertification, drought and food insecurity (Pahad, 2007).

¹⁶ Mahendra Shah is a leading economic analyst based at the International Institute for Applied Systems Analysis in Austria. In 2002 he co-authored a report entitled "Climate Change and Agricultural Vulnerability" for the World Summit on Sustainable Development in Johannesburg in August 2002.

Research indicates that South Africa will be at risk from increasing water stress. Clean potable water will become scarcer, while small scale agriculture will be affected by less rainfall in some regions and too much in others. South Africa will become hotter and drier in the west and hotter and wetter in the east. Research undertaken by Oxfam International¹⁷ (Magrath, 2005:1-5) in South Africa indicates that the Limpopo Province in the northern part of South Africa will experience a later onset of the wet season, which will increase the impact and duration of the dry season and have a negative effect on crop production, seed capturing, animal fodder, grazing and the survival rate of young animals. The North West Province is already experiencing increased drought which makes soil less productive, results in poor quality grass for grazing, livestock die, dry-land crops die and pests proliferate. KwaZulu Natal is experiencing highly variable and uncertain seasonal changes, with an increase of early season rain and a decrease of late season rain, hail, frost, snow and heavy rain, with disastrous effects on crops, livestock and socio-economic wellbeing (Magrath, 2005:1-5). In some areas agricultural production could be reduced by up to 50% by 2020.

Regional migration will increase, placing extra burdens on already insufficient urban infrastructure. Climate change will exacerbate the worst effects of poverty and result in a general decline in all socio-economic spheres. In a developing country like South Africa the poorest communities will be most affected (Van Schalkwyk, 2005).

Research indicates that the Western Cape will be one of the provinces that are most vulnerable to climate change, irrespective of local or global efforts to reduce greenhouse gas emissions (Midgley *et al.* 2005a). Some of the key research findings include: an increase of at least 1°C in the annual average temperature by 2050; an increase in the frequency of extreme events such as floods, droughts and fires; reduced rainfall particularly in the western parts of the region; and reduced soil moisture resulting in reduced crops (Essop, 2007).

The Western Cape's natural resources such as water, biodiversity and coastal and marine systems are under threat. Sufficient water is essential for livelihoods. Many areas in the Western Cape are already experiencing water stress and this is certain to increase. Climate change will also

¹⁷ Oxfam International is a confederation of 13 organizations working with more than 3000 partners in more than 100 countries to find lasting solutions to poverty and injustice. <http://www.oxfam.org.uk>

place pressure on the Cape's unique biodiversity, threatening 35% of the Fynbos and the Succulent Karoo species with possible extinction. The coastline is vulnerable to sea level rises which will impact on the coastal ecology, particularly the 50 estuaries which form important links in the economic and ecological chain as feeding and nursery grounds for shellfish, fish and bird species (Essop, 2007).

Coastal cities like Cape Town and Durban are at risk of flooding in the medium to long term. The destruction caused by the recent high seas in Durban was an alarming reminder of the destructive force of the ocean. Low lying settlements on the Cape Flats would also be exposed to possible flooding due to sea level rise, displacing hundreds of thousands of the poorest of the poor (Essop, 2007).

3.3 IMPACTS ON SCARCE RESOURCES IN NEIGHBOURING COUNTRIES

South Africa's neighbouring countries are already vulnerable to climate variability and the majority have the least capacity to respond (Stern Review, 2006).

3.3.1 BOTSWANA

Botswana is a landlocked country in the centre of the Southern African Plateau. The country is largely semi-arid and has low increasingly erratic rain flow (SADC, 2004). The eastern region has a relatively less harsh climate and more fertile soil than the rest of the country. The remaining two thirds of Botswana, also known as the sand veldt, is covered by the thick sand layers of the Kalahari desert, where there is almost a total absence of surface water. Due to the lack of water resources nearly all agriculture relies on rain water for irrigation under traditional methods. Between 75% and 96% of the various national annual staple cereal requirements are already being imported.

Due to the adverse agro-climatic conditions in Botswana livestock production is more sustainable than crop farming, but this too is being threatened by drought conditions (SADC, 2004).

3.3.2 LESOTHO

Surrounded by South Africa, the small mountain kingdom of Lesotho has been one of the countries that have been worst hit by climate change and is experiencing its most severe drought in 30 years. The maize crop, which is the country's staple food, has dropped by more than half since 2006. The shortages will be exaggerated by the decreased cereal production in South Africa for the same period, as Lesotho relies on South Africa for approximately 70% of its food needs. About 500 000 people in Lesotho are battling to overcome food shortfalls and drought (Appel, 2007). About 82% of Lesotho's population of 1.8 million live in rural areas and farming is the main source of revenue for 60% of the people. The wet season used to be predictable - starting in August the rains would continue until January. Now they receive only one month's rain, often in downpours that erode the soil and leave the land non-arable. The rains failed again this year and the UN expects hundreds of thousands of people to face food shortages in the coming months and is preparing to assist with a huge relief operation. According to the UN World Food Programme's estimates approximately 35% of the population will be needing food aid suffering from malnutrition by 2008 (Mason, 2007).

Lesotho depends on South Africa for most of its needs and a large part of the population are dependent on the life-saving remittances from the 50 000 men who work in South African mines (Poor little brother..., 2007).

3.3.4 MOZAMBIQUE

In the late 1990's and early 2000's, after the end of years of brutal civil war, Mozambique flourished with an economic growth rate of 8% per annum. Massive floods in 2000 and 2001 killed thousands and displaced hundreds thousands more. The latest floods have uprooted 160,000 people, while cyclone Favio has devastated certain areas leaving 150,000 people destitute. Severe drought in the south has caused massive losses of crop and livestock, possibly threatening the country's recovery (Costello, 2007). While Mozambique is already depending on international food aid it will possibly lose up to 25% of its food production in the next fifty years on currently cultivated land as a result of climate change. Ironically Mozambique itself has not contributed to climate change as it only produces 0.1 tons of carbon dioxide emissions a year (Shah, 2003).

More than 160,000 people have been affected by severe flooding since January 2007, Mozambique is rich in land resources and if the water can be tapped and managed it will be rich in water resources as well, but with limited infrastructure capabilities it is reliant on flood control measures and emergency aid from neighbouring countries like South Africa. Poor infrastructure such as crumbling roads and airports, derelict buildings, a lack of adequate health facilities, and a lack of climatic 'early warning systems' are all factors that further exacerbate the problems (Costello, 2007).

3.3.5 NAMIBIA

In the words of Dr. Kaire Munionganda Mbuende¹⁸ (2007) 'climate change is not an academic exercise for Namibia, but a matter of life and death'. Namibia is expected to face an absolute water shortage by 2020. Ranked amongst the countries that will be the most vulnerable to climate change in coming years, the water sector will be the most severely affected.

Namibia's two deserts, the Kalahari in the east and the Namib in the west are spreading, claiming more and more of range and agricultural land and rendering it inhabitable. Research has indicated that sea levels are to rise by as much as 1 metre by 2100, flooding the coastal areas of Walvis Bay, Swakopmund and Henties Bay, where the loose sand on which the towns are built wont withstand the force of floods (Mbuende, 2007).

Changes could also have a negative effect on household food security, leading to social disruption and displacement in rural communities. Plants used for traditional medicine are in danger of extinction, thus extending the impact of climate change to self sustaining traditional health measures. Fisheries could be affected by warming of the Benguela Current, a trend which may already be responsible for the decline in fish stocks. Climate change will be a costly exercise for Namibia. The majority of people are dependent on natural resources, which are being destroyed by the combination of droughts, veld fires, and floods. More than 70% of Namibians depend directly and indirectly on agriculture (Mbuende, 2007).

¹⁸ Permanent Representative of Namibia to the United Nations.

Fully aware of its vulnerability to climate change Namibia acceded to the Kyoto Protocol in July 2003. Cabinet has acknowledged that economic growth depends on the protection of natural resources, which are extremely fragile as a result of the arid climate (Namibian, 2007).

3.3.6 SWAZILAND

According to the World Food Programme (WFP), over 400,000 of a population of 1 million Swazis are now dependent on food aid – double the number in 2006. Swaziland falls within a summer rainfall region where about 80% of the rainfall is during the summer months of October to March. Swaziland has always experienced severe thunderstorms and windstorms, but was subjected to its first tornado in 2005 in central Swaziland. In the last 15 years there has been a 12% increase in days with temperatures above 35°Celsius and up to 50% decline in precipitation during the months of September and October. Storms are also more frequent and more intense (IRIN, 2007).

Agricultural experts met in July to find solutions to Swaziland's ongoing crop failures and food shortages. They blamed climate change for declining food production. The country is faced with drought in all four regions and there is an urgent need to establish secure water supply for all. Population pressure, combined with drought, has made some regions unsuitable for crop production. Previously marginal lands are now deserts, and productive lands are becoming marginal as a result of mono-cropping, deforestation for firewood that leads to soil erosion, overgrazing and climate change (IRIN, 2007).

As one of the poorest countries in the world – 70% of the population live on less than \$1 a day – it is in need of urgent support. The government and UN agencies are addressing the consequences: WFP is increasing its food aid and there is collaboration on agricultural and water issues to avert a human crisis (IRIN, 2007).

3.3.7 ZIMBABWE

When Zimbabwe's despotic president, Robert Mugabe finally leaves office, a shattered country will have to be rebuilt. Although the current causes of the collapse are mainly political, the impact on scarce resources has been devastating to the residents of Zimbabwe. The ramifications are having adverse affects on neighbouring countries as well.

Like the rest of the sub-region Zimbabwe has been subjected to extreme droughts and floods over the past few years, but the country's agriculture has been largely destroyed by the government's disastrous land-reform policies. Historically considered the food basket of Africa, there is now a severe shortage of staples and the most basic goods. Most of the land where tobacco and maize used to grow lies fallow. The UN World Food Programme estimates that approximately 4 million Zimbabweans will be needing food aid by the beginning of 2008 (Economist, The. 2007 b).

Zimbabwe has recently been ranked 4th highest on the annual failed-states index produced by 'Foreign Policy' magazine and the Fund for Peace (Economist, The. 2007 c). Although Zimbabwe's vulnerability is not due only to climatic conditions, it serves as a useful indicator of the possible impacts of environmental stress and resource scarcity on an impoverished society.

3.4. CONCLUSION

Although local/region scale research information is lacking for Southern Africa it is apparent from the findings of all significant research that climate change – in the sense of rapid, large-scale and noticeable climate change - is already taking place, with far reaching economic and social effects (Magrath, 2005). In the main, climate change worsens existing stresses, rather than introducing radically new problems. Africa's adaptive capacity is generally low, and with the increase in the frequency and intensity of extreme climatic events it is probable that the adaptive capacity of most states will be further weakened. The resources they rely on to boost their resilience will be progressively eroded. Increased climate variability combined with the dependence of African economies on agriculture and direct consumption of scarce resources, could create the potential for devastatingly negative consequences as a result of climate change (Nkomo *et al.*, 2006:40-41).

CHAPTER 4

THE IMPACT OF CLIMATE CHANGE ON HUMAN SECURITY

4.1 INTRODUCTION

The possible consequences of climate change are varied and potentially serious, certainly altering existing patterns of consumption, production as well as human settlement patterns. Almost as many people are forced to leave their homes due to environmental disasters and natural resource scarcity as flee political oppression, religious persecution and ethnic turmoil (Myers & Kent, 1995:). The link between acute conflict and climate change has not been explored extensively and it is likely that conflict could emerge as a result of environmentally induced migration (Gleditsch *et al.* 2007:4).

Africa has an extremely complex and unpredictable climate that is not fully understood by climatologists, due to a lack of current data to feed into models. The impacts of climate change on countries in Africa have to be seen in conjunction with an understanding of non-climate vulnerabilities – a combination of social, economic and other environmental factors that interact with climate change. The interaction of these factors is what makes Africa the most vulnerable region to climate change (Nkomo *et al.*, 2006:2).

Based on the conflict theories of Homer-Dixon (1991), Kaplan (1994), Gleditsch *et al.*(2007) and others this chapter will attempt to analyse the effects of climate change on scarce resources in South Africa and neighbouring countries, the likelihood of environmental migration, within South Africa as well as into South Africa from neighbouring territories, and the potential conflict that may result. As these are future possible scenarios, findings will largely be based on comparable past events and human behaviour in other countries. This section will analyse migration as one of the most plausible links from climate change to conflict.

4.2 REDEFINING HUMAN SECURITY

‘Human insecurity’ is an ancient phenomenon – threats of famine, war, drought, flood, plague and enslavement appear in writings from all parts of the ancient world. Human insecurity is however not an historic anomaly. While debate continues about the conceptual framework of

human security, what is apparent though is that the kinds of insecurity and the institutional possibilities of tempering that insecurity have changed (Alkire, 2003:9).

The notion of human security spans sectors and continents, people of all denominations and all levels. The reason why the concept is currently receiving wide spread focus of attention is that safeguard mechanisms to combat certain security threats do not exist, which could be as a result of oversight or the emergence of new threats. The composition of threats in the post-Cold War era of globalisation is very different to before, and some are quite unprecedented. However, the technological advances of the contemporary world as well as political changes have also increased the opportunities for effective coordination to buffer the threats. Scientific advances continue to expand the knowledge base, and whatever undermines human security is in the main a result of the disparity between security threats and response mechanisms (Sen, 2000:2).

The human security agenda has received substantial criticism on the grounds of vagueness, incoherence, arbitrariness and most often of it being conceptually too 'wide' to use. Alkire (2003) offers a useful conceptual approach to human security with her term 'vital core', which implies that although institutions and interventions that undertake to protect human security will not be able to protect all aspects of human security, they will at least protect the vital core. The vital core refers to very rudimentary rights or freedoms, i.e. those human capabilities that should be protected even in times of upheaval and need, namely capacities related to survival (freedom from premature death), livelihood (basic material needs) and dignity (Alkire, 2003:22-29).

The task of conceptualising human security analytically may seem pedantic, but it is essential that there is a constant sense of significance attached to the objective of protecting human security in a clearly altered and more complex globalised world. For example, on the basis of ongoing academic studies, insights are gained into the interrelationship between poverty and conflict or resource scarcity and migration, in order to reap the benefits of addressing interrelated variables jointly. New realities require more simultaneous relief, rehabilitation and development interventions, and the resulting need to establish new institutions or institutional measures to address human security (Alkire, 2003:12).

4.3 FINDING THE LINK

As highlighted earlier the Stern Review believes the impacts of climate change on scarce resources will result in scarcity, mass migration and conflict in parts of the developing world. The review cites estimates that by 2050 as many 200 million people may become ‘climate refugees’ as a result of rising sea levels, heavier floods and more extreme droughts (Stern Review, 2006:). Gleditsch *et al.* (2007) point out that, although much of the literature regarding climate change is speculative as a result of data restraints, they believe there is a feasible link between climate change and human security: mass migration (Gleditsch *et al.*,2007:4).

4.3.1 RESOURCE SCARCITY AND HUMAN SECURITY

If conceptualising human security in terms of the ‘vital core’, resource scarcity would have a direct impact on human security. Resource scarcity refers to those resources that are vital to human survival. It refers mainly to renewable resources such as water, fuel wood, food and soil, and arises due to reduced supply and increased demand and/or increasing inequality of distribution (Martin *et al.*, 2006:1-4).

Based on the analyses of Gleditsch *et al.* (2007:4-11) and Homer-Dixon (1991:77-85) there is a direct link between resource scarcity and conflict, although each country reacts differently to environmental stress, depending on a number of interrelated factors, such as poverty, education, state capacity and infrastructure. As confirmed by the findings of the Stern Review parts of Southern Africa have been experiencing increased frequency of climatic extremes, such as droughts and floods, over the past 30 years. South Africa is very vulnerable to circumstances that result in environmental stress in neighbouring countries, as has been evident in the past. Droughts, unrest, floods, food shortages etc. in these territories impact directly on South Africa, the economic powerhouse and most stable regime in the region, for relief and support.

Cornucopian theorists propose that market driven human ingenuity will always transcend scarcity with substitutes of more abundant resources, and human enterprise will always respond to impending shortages and threats with new improved expedients (Homer-Dixon, 1991: 101). This has not been the case in times of stress in developing countries in southern Africa. Droughts in the region have left millions in need of emergency food aid. Changes in rainfall

patterns have dramatically affected South Africa, Zimbabwe, Botswana, Mozambique, Lesotho and Swaziland over recent years. The Southern African Humanitarian Information Network for coordinated disaster response (SAHIMS) estimated in 2004 that by the middle of that year as many as 15 million people in South Africa alone would need food aid, and the South African government made US \$35.5 million available to assist approximately 19 million rural people in the sub-region, who had been affected by the worst droughts in recent decades. Of this, US \$14 million was spent to provide drinking water and close to US \$5 million went towards supplying animal fodder (SAHIMS, 2004). These impacts placed South Africa in the centre of a regional crisis, which is expected to worsen dramatically in the foreseeable future.

According to Homer-Dixon (1999) resource scarcity no longer develops slowly as in the past, leaving little time for innovation and adaptation. Due to increased populations consumption is much more intense, leading to scarcities much more rapidly e.g. deforestation for fuel wood or land clearing for agricultural purposes happens at a much faster pace, putting increased pressure on limited resources which are already under stress as a result of environmental damage and climate change. As our research has shown, extreme and sudden climatic events in countries neighbouring South Africa have caused great hardship and threatened the human security of millions of poor people.

A further issue is how to measure scarcity. Homer-Dixon (1999) and Kahl (2006) operationalise environmental scarcity as consisting of three types of scarcity: (i) *supply induced scarcity* i.e. the absolute supply of a resource, the ways of accessing it, and its vulnerability. South Africa and neighbouring countries would fall victim to supply induced scarcity as a result of agricultural decline; (ii) *demand induced scarcity* being the per capita resource availability multiplied by the per capita consumption will arise in most territories as a result of population growth; and (iii) *structural scarcity* which denies any direct link between renewable resource scarcity and conflict, and in which political and economic processes are far more important than the actual quantity of a resource. If scarcity results in conflict it is seen as the outcome of distribution and discrimination interacting with the scarcity of the resource. (Gleditsch & Theisen, 2007:7-8).

The apartheid system institutionalised the unequal distribution of environmental resources in South Africa, which resulted in extreme structural scarcity for the black majority. Approximately

86% of the land was owned by the white minority while the black majority had to subsist on the remaining 14% of the land that was also the most marginally productive land. The disenfranchised and economically disempowered black population was forced to subsist on a restricted and eroded land base and this structural scarcity interacted with and worsened demand- and supply-induced scarcities (Percival & Homer-Dixon, 1998:283-284).

The Stern Review (2006) points out that Africa and Southern Africa in particular, will be affected first and most by the impacts of climate change. Evidence of intense droughts, frequent floods, and dramatic food shortages in South Africa and the neighbouring countries bears witness to this. Neo-Malthusian scholars point out that different countries have different capacities to respond to crises and highlight the vulnerability of poor and unstable states to resource scarcity. South Africa has had the greatest ability to cope financially, socially and economically with the demands of environmental stress within its own borders, compared to its neighbours who have not displayed the human-environmental resilience, variability and adaptability anti-Malthusians argue will enable developing countries to minimise the negative impacts of environmental degradation. As suggested by Homer-Dixon, developing countries such as Lesotho, Swaziland, Mozambique and Zimbabwe, with growing populations and increasing environmental degradation, find it more and more difficult to intervene to prevent serious disruption, due to limited resources and fragile institutions (Homer-Dixon, 1991:76-88). Without assistance from South Africa or international aid organisations millions of people would have been subjected to even greater human insecurity.

Resource scarcity also results in a brain drain, as the more qualified people are more able to afford relocation in search of better fortunes. The majority of people live in rural areas and depend on agriculture for their survival. Traditional adaptive measures are no longer sufficient to respond effectively to the more complex and interrelated nature of current environmental stressors, which require technical know-how and abundant reserves of capital.

The South African government sees the task of promoting peace and security in Southern Africa as a compelling necessity in securing the country's own well-being. A common approach to security is necessary for a number of reasons. Many of the domestic threats to individual states are shared problems that impact negatively on the stability of neighbouring states. The security

of South Africa's national borders cannot be guaranteed if insecurity and underdevelopment prevails in the sub-region. South Africa's strategic approach to the collective security of Southern Africa is therefore based on three key pillars:

- The security of national states in the sub-region (national /sovereign security)
- The security of the sub-region's inhabitants and peoples (human security)
- The security of the sub-region's entire environs (environmental security, or the sustainable utilisation of the sub-regions natural resources)

(Selebi, 1999).

Any attempts at securing national security only, without focusing on human and environmental security, will fail to address the fundamental causes of conflict and instability that threaten the sub-region (Selebi, 1999).

Countries' abilities to respond to the negative impact of climate change on scarce resources are greatly dependent on state capacity to govern, the level of corruption, conflicts and the strength of institutions. When these factors are combined with stressors like rampant population growth, pervasive poverty, food shortages, and environmental disasters like floods and droughts a territory's vulnerability is that much greater than in a developed, affluent state. The combination of many or all of these factors makes South Africa's neighbouring states very susceptible to the negative impacts of climate change (Nkomo *et al.*, 2006:3).

The cropland, forests, and water supplies that support the livelihoods of millions of rural people are renewable. Unlike non-renewable resources such as oil and iron ore, renewables are naturally replenished over time. If used with prudence they should suffice to support an adequate lifestyle indefinitely. Where people rely on renewable resources for survival, they are often depleted faster than they are being renewed. The fourfold growth in total world population since 1900 has combined with far greater per capita consumption, which has resulted in huge increases in global energy consumption, carbon emissions, water use, fish consumption, land degradation and deforestation (Homer-Dixon, 1999:12-13).

Over the next decades growth in populations and consumption will affect many poor countries in Southern Africa with unprecedented severity, speed and scale. These societies will have to be smarter, technically and socially, in order to sustain their well-being. Optimists often mistakenly assume that enough of the right kind of ingenuity is always assured in the face of scarcity. In South Africa's neighbouring countries the supply of ingenuity is restricted by a number of factors, including brain drain, limited financial means and technical skills, incompetent bureaucracies, corrupt judiciaries, and weak states. Societies like these increasingly face a widening 'ingenuity gap' as their need for ingenuity to deal with environmental stresses rises, while their supply of ingenuity stagnates or declines.

By 'ingenuity' is meant ideas applied to solve practical social and technical problems. Technical ingenuity is required to solve problems in the physical world such as the challenges to develop new plant varieties suitable for dry climates and eroded soil or water and energy conservation technologies. Social ingenuity is the key to the creation, reform and maintenance of public goods such as markets, funding agencies, education and research organisations, and effective governance. Social ingenuity is also required for successful adaptation strategies such as arranging food transfers from food producing to food-scarce regions in advance of scarcities. This ingenuity is produced at all levels of society from astute political leaders to community and household levels as people learn how to solve collective-action problems. As resource scarcity increases, the social and technological problems in a society become more complex, unpredictable and pressing. Greater scarcity increases the demand for ingenuity, while the supply of ingenuity is restricted by market failure, social friction, shortages of capital and constraints on science. Some societies will eventually develop a chronic 'ingenuity gap' between their demand for and their supply of ingenuity (Homer-Dixon, 1995a:590-594). Countries with a critical ingenuity gap therefore risk becoming trapped in a downward spiral, in which extreme scarcity further undermines their ability to mitigate or adapt to scarcity (Homer-Dixon, 1999:25-26). Zimbabwe is a case in point, where property rights are unclear, the judicial system is corrupt, inflation is rampant placing already scarce resources beyond the financial reach of the majority of the people, the brain drain has continued for years, the government of Robert Mugabe is tyrannical, and thus entrepreneurs have no incentive to respond with ingenuity to resource scarcities. (Homer-Dixon, 1999:25-26)

Mozambique, one of the poorest countries in the world, is highly vulnerable to climatic irregularities. Floods in Mozambique in 2000 and 2007 left hundreds of thousands of rural people homeless and in the 2000 flood alone 350,000 jobs were lost, affecting the livelihoods of up to 1.5 million people. In the same period about 80 000 people were left homeless by floods in Zimbabwe and an estimated 60 000 were destitute after four weeks of heavy rain. South Africa had to respond to appeals by President Chissano of Mozambique to render aid in the form of helicopter evacuation assistance, emergency supplies, food relief and funding to save lives and ease suffering. Many people were evacuated to makeshift camps where further aid was required to supply clean water, food and medical supplies (CNN.com, 2000).

In Lesotho the production of maize, the country's main staple, production dropped by more than 50% between 2006 and 2007, leaving more than 500 000 people with food shortages and ongoing drought. Lesotho relies greatly on South Africa for its food requirements, which could be threatened by a drought induced decrease in cereal production in South Africa over the same period. The UN has made an appeal for US \$18.9 million in aid for food, subsidised agricultural inputs for small farmers and the promotion of home gardens (Appel, 2007).

4.3.2 RESOURCE SCARCITY AND MIGRATION

The Stern Review (2006) cites an estimate that by the middle of the century 200 million people may become permanently displaced 'climate refugees' due to rising sea levels, heavier floods and more intense droughts (Stern Review, 2006:77). There is already a huge inward migration into South Africa and the term 'climate' or 'environmental refugee' applies to the fastest growing group of refugees acknowledged by the United Nations High Commission on Refugees (UNHCR).

The decision to leave one's native land is not a simple one, and people generally choose to battle to survive the impact of environmental disruptions until all hope of survival disappears. Environmentally forced human migration is not a new phenomenon however what is more recent is the potential for mass migration caused by irreversible environmental destruction. Large numbers of people are moving within and across international borders and from rural to urban areas. The United Nations Population Fund (UNPF) (1993) warned in its *State of the World Population 1993* that this unprecedented migration 'could become the human crisis of our age'.

According to Simms (2005) there are possibly more environmental refugees than their political counterparts – 25 million in the mid-1990’s compared to 22 million conventional refugees. By 2050 this is likely to have increased to more than 150 million as a result of climate change (Simms, 2005:30).

There is growing international and regional concern about how to deal with the impact of these vast movements of people and their needs. Unless properly managed the effects of the scale of population movements would be very destabilising to the global community. As with the environmental impacts of climate change, the countries least liable for creating the problem – poor developing countries – will receive most of the refugee flows and carry the largest share of the related costs (Simms, 2005:30).

4.3.2.1 Classifying environmental refugees

What distinguishes environmental refugees from other refugees – or other migrants? The legal definition of the term ‘refugee’ was imposed by the 1951 United Nations Convention on Refugees:

*The term ‘refugee’ shall apply to any person who...owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or owing to such fear, is unwilling to avail himself of the protection of that country; or who, not having a nationality and being outside the country of his former habitual residence as a result of such events, is unable or, owing to such fear, is unwilling to return to it.*¹⁹

This legal limitation to the term ‘refugee’ cannot accommodate types of forced migration not stemming from persecution. The term is also limited to trans-border refugees and does not include internally forced migrants (Swain, 1996:964). Social scientists who have produced expansive literature on the topic (Myers,1997:167-182; O’Lear,1997:608-618; Hugo,1996:105-131; Ramlogan,1996:81-88) all more or less uncritically uphold the concept of environmental

¹⁹ Quoted in L. Gordenker, ‘The United Nations and refugees’ in L. Finkelstein (ed.), *Politics in the United Nations System*, Durham, NC: Duke University Press, 1988, p.199.

refugees developed by the United Nations Environmental Programme (UNEP0) (Bates, 2002:465):

(Environmental refugees are) those people who have been forced to leave their traditional habitat, temporarily or permanently, because of a marked environmental disruption (natural and/or triggered by people) that jeopardized their existence and/or seriously affected the quality of their life [sic]. By ‘environmental disruption’ in this definition is meant any physical, chemical, and/or biological changes in the ecosystem (or resource base) that render it, temporarily or permanently, unsuitable to support human life (El-Hinnawi, 1985:4).

El-Hinnawi (1985) however did not specify criteria to distinguish between environmental refugees and other types of migrants, nor did he specify differences between different types of environmental refugees. Bates (2002) identifies the difference between migrants and environmental refugees on the basis of a continuum of control over the decision to migrate as a result of environmental change. Bates’ working definition of environmental refugees includes *people who migrate from their usual residence due to changes in their ambient non-human environment*, includes the two most important features of environmental refugees: the transformation of the environment to one less suitable for human occupation and the acknowledgment that this causes migration (Bates, 2002:468).

Table 1: Continuum of control over migration decisions in situations of environmental change

| INVOLUNTARY | COMPELLED | VOLUNTARY |
|-----------------------|------------------------|-----------|
| ENVIRONMENTAL REFUGEE | ENVIRONMENTAL EMIGRANT | MIGRANT |

(Source: Bates, D. 2002)

Degrading environments affect human migration but this may result from compulsion or voluntary decisions made by individuals or households. Voluntary decisions to relocate characterises voluntary migrants for which the most common motive generally involves the desire for economic improvement. Other migrants that are forced to relocate are known as refugees which El-Hinnawi (1985) classified into three major types: those temporarily dislocated

due to disasters, those permanently displaced due to drastic environmental changes, such as the construction of dams, and those who migrate due to gradual environmental deterioration. The environmental refugees that are compelled to migrate due to the gradual deterioration of the environment due to pollution or depletion, have a degree of control over when, where and how they migrate. The term 'environmental emigrant' best suits this type of refugee, as disaster and expropriation refugees have little, or no control over their migration. In the case of environmental emigrants individual members of families are dispatched first to take advantage of distant opportunities and the movement of entire households is a choice of last resort.

4.3.2.2 The migration link

Gleditsch *et al.* (2007) believe that although much of the literature on the socio-economic impacts of climate change is speculative and based on scenarios there is a most plausible link between resource scarcity and conflict: migration (Gleditsch *et al.*, 2007:1).

Climate change is likely to be a major factor leading to mass migration from increasingly uninhabitable regions, and population relocation resulting directly or indirectly from environmental pressures can place substantial pressure on migrant-receiving areas (Gleditsch *et al.*, 2007:1). Research on global climate change identifies several mechanisms that may force people to evacuate their current habitat.

Sea-level rise as a result of glacial melting may cause the flooding of coastal areas. Recent storms along the coast of Durban caused tremendous damage to coastal properties and signs of coastal degradation are evident in towns on the coast of Namibia. Cape Town city centre and the peninsula would also be vulnerable with hundreds of thousands of people living along its famous coastline. Low-lying residential areas on the Cape Flats, where the majority of the city's poorest inhabitants live in very rudimentary shacks, would be very susceptible to permanent flooding. Residents are already temporarily displaced every winter after a heavy downpour. Referring to the stern warnings of the Stern Review, Essop (2007) stressed the need for urgent action to mitigate the impacts of these eventualities that would result in forced internal migration into already densely populated and environmentally stressed areas.

Desertification may cause people to relocate from unproductive and water-scarce areas and droughts will increase in frequency and intensity. *Extreme weather events* such as hurricanes,

typhoons, flooding and extreme cold could result from greater variability in weather patterns. The unpredictability of such dramatic events may disrupt and uproot many human settlements. Irregular rainfall patterns will also lead to periods of flooding and drought, which could make certain regions uninhabitable (Gleditsch *et al.*, 2007: 4).

El- Hinnawi (1985) distinguished three categories of disruptions: disasters, expropriations and deterioration. Examples of all three categories of environmental disruptions have resulted in population displacement in South Africa or its neighbouring states. Natural *disasters* like repeated floods in Mozambique and droughts in large parts of the region over the past number of years have led to the involuntary displacement of thousands of people. The *expropriation* of land for the Lesotho Highlands Project resulted in the flooding of vast tracts of land that were previously used for grazing and habitation. In Zimbabwe Mugabe's disastrous Land Reform Programmes combined with drought and human abuse have led to extreme *deterioration* of ecosystems and farm land. The gradual degradation of the local resource base has resulted in the displacement of thousands of people in search of human security.

Table 2: Classification of Environmental Refugees with Examples

| CATEGORY | DISASTER | | EXPROPRIATION | | DETERIORATION | |
|------------------------|---------------|---------------------|-------------------------|---------------|----------------|----------------|
| Sub- Category | Natural | Technological | Development | Ecocide | Pollution | Depletion |
| Origin | Natural | Anthropogenic | Anthropogenic | Anthropogenic | Anthropogenic | Anthropogenic |
| Intention of migration | Unintentional | Unintentional | Intentional | Intentional | Unintentional | Unintentional |
| Duration | Acute | Acute | Acute | Acute | Gradual | Gradual |
| General Example | Volcano | Meltdown | Dam Building | Defoliation | Global Warming | Deforestation |
| Real- World Example | Montserrat | US-TMI Nuclear Leak | China- Three Gorges dam | Vietnam | Bangladesh | Ecuador-Amazon |
| Est. Number Displaced | 7,000 | 144,000 | 1,3 million | 7 million | 15 million | 115,000 |

(Source: Bates, 2002:470)

According to projections by the United Nations Environmental Programme and ecologist Norman Myers (1993) most of the migration resulting from human additions to or depletion of

the environment are still to occur in the future, affecting from 50 to 150 million people. As depletion worsens people will have to search for ways to compensate (Myers, 1993:752-761). Sub-Saharan Africa is the prime locus of environmental refugees where more than 80 million people are considered to be semi-starving mainly due to environmental factors (Myers & Kent, 2001:41-69). The numbers of environmental refugees will increase steadily as the growing numbers of impoverished people continue to press harder on the already overloaded environments of developing countries (Myers, 2002:609). The issue of environmental refugees could probably be categorised as one of the prime human crises of our times. It has however been considered a peripheral concern even though it is an external symptom of extreme dispossession and despair. Although fundamentally derived from environmental problems, it creates problems of a political, social and economic nature (Myers, 2002:611). Yet as the problem becomes more severe, there is still a lack of official recognition on the part of governments and international agencies, that an environmental refugee crisis exists (Myers, 2002:610).

The conflict between growing human needs and the availability of renewable resources is rapidly becoming more critical in many developing countries. Encroaching deserts, deforestation, declining water supplies, changes in the climate and the extinction of species pose a threat to the survival of present and future inhabitants of these regions. There are many reasons for the susceptibility of the developing world to environmental stress. Population growth and efforts to modernise have led to environmental destruction that has pushed more and more people towards the margins of survival. Existing inequalities become greater, leading to social unrest that developing countries are unable to control, because of weak state and bureaucratic mechanisms (Swain, 1996:960-962).

About one third of today's global population experiences moderate to high water stress, Not only is water an essential source for all life, it is also a crucial requirement for most industrial production, poverty alleviation and development (Stern Review, 2006:62). In order to deal with this, many developing countries are overexploiting the available water supply by building massive hydro-projects in populated areas and in doing so submerging large areas and displacing already vulnerable people and flooding valuable agricultural and grazing land. The Lesotho Highlands Water Project went into effect between South Africa and Lesotho in 1986. Thirty

thousand Sothos had been relocated by 2003 to make way for the project's first two dams, losing their homes, farm land and communal grazing space (Wide Angle, 2007). Construction and flooding of the Inanda Dam in the KwaZulu-Natal province of South Africa displaced more than a thousand families without relocation or financial compensation. The majority of these families remain destitute and landless. While large hydro-projects bring benefits – in the case of Inanda Dam, improved water supply to Durban – the price in terms of environmental and social affects are often too high (Greeff, 2007).

Many environmental stresses relating to climate change are gradual and will lead to limited, but ongoing migration. Sea level rise, as predicted by the IPCC and independent scientists, will flood the living space of millions more people in coastal areas. Sea level rise and desertification will manifest over a matter of decades. Gleditsch (2007) argues that receiving areas are mostly able to adapt to gradual migration (Gleditsch *et al.*, 2007:4).

However even wealthy strong states like America and countries in northern and southern Europe are having difficulties controlling the influx of migrants in search of a better living, although they have far greater access to resources and capabilities than South Africa.

Accurate statistics for the numbers of migrants arriving in South Africa from neighbouring countries are unreliable as the majority of entrants from neighbouring countries enter illegally for fear of deportation. The same applies to official entrants who state their purpose of visit as 'holiday'. As the majority of arrivals are from impoverished countries one needs to question the validity of this statistic, and can but presume that the information is once again falsified for fear of prosecution and repatriation.

Table 3: Number of foreign arrivals in South Africa by country of origin and purpose of travel

| Country | June '06 | June '07 | Business | Holiday | Study | Work | Transit | Unspec. | Total |
|------------|----------|----------|----------|---------|-------|-------|---------|---------|---------|
| Africa | 480 288 | 502 083 | 9 233 | 476 681 | 3 515 | 2 504 | 1 725 | 88 | 493 746 |
| SADC | 470 285 | 490 847 | 8 241 | 467 479 | 3 251 | 1 866 | 1 612 | 86 | 482 535 |
| Angola | 1 856 | 2 327 | 99 | 2 035 | 95 | 64 | 34 | - | 2 327 |
| Botswana | 54 205 | 58 730 | 89 | 57 148 | 1 094 | 179 | 158 | - | 58 668 |
| Lesotho | 147 130 | 150 902 | 531 | 141 753 | 377 | 111 | 565 | - | 143 337 |
| Mozambique | 69 939 | 82 522 | 299 | 81 605 | 157 | 111 | 37 | 3 | 82 212 |
| Namibia | 12 265 | 14 452 | 1 915 | 11 734 | 280 | 49 | 472 | - | 14 450 |
| Swaziland | 78 371 | 81 174 | 451 | 79 722 | 585 | 144 | 114 | 72 | 81 088 |
| Zimbabwe | 80 504 | 70 578 | 1 972 | 66 861 | 469 | 899 | 114 | 4 | 70 309 |

(Source: StatsSA : 2007)

Zimbabwe undoubtedly provides the most migrants and asylum seekers in South Africa. According to the World Food Programme (WFP) food is being distributed to 26 drought affected districts where tens of thousands of impoverished people are facing starvation. It is estimated that more than a thousand Zimbabweans illegally cross into South Africa daily and in the first six months of 2007 the International Organisation for Migration processed 117,743 people repatriated from South Africa at its facility at Beitbridge on the Zimbabwe border. Deputy Foreign Minister Aziz Pahad conceded at a recent media briefing that Zimbabwean migration had become a 'serious problem', leaving South Africa to deal with the complex challenges that result (Pahad, 2007).

4.3.3 CLIMATE CHANGE AND CONFLICT

4.3.3.1 Resource scarcity as a cause of conflict

The environment, population and conflict theories have resulted in diverse arguments and remain a focus in environment and security debates, in ongoing attempts to unravel the complex linkages among the three variables. Human-induced climate change is one of the most radical

neo-malthusian scenarios, controversially linking climate change to social consequences and migration, and ultimately to conflict. Cornucopian contrarian views are sharply critical of the environment-conflict hypotheses based on the research methodology used by Homer-Dixon and his associates, maintaining that the proposed causalities are fraught with speculation, the methodology is unsound and the selection of case studies is determinalist and therefore hard to evaluate. Liberals and political ecologists differ on many points, but share a focus on the role of institutions and processes that control people's lives.

The claims that environmental factors should be integrated into the concept of security were first introduced in the early 1980's and scholarly work can be divided into three generations as proposed by Levy (1995):

Table 4: The Three Generations Summarised

| Starting | First Generation Early 1980s | Second Generation Early 1990s | Third Generation Mid-1990s |
|--------------------|---------------------------------|----------------------------------|---------------------------------------|
| Scholarly approach | Conceptual debate | Process tracing | A broad range of social methodologies |
| Field of analysis | Environment and security | Renewable resources and conflict | Environment and security |
| Level of analysis | Global/State/Individual | State/Sub-state | Global/Regional/State/ Sub-state |

(Source: Levy, 1995)

The first generation of environment and security academics refer to an interdisciplinary debate on whether and how environmental matters should be included into security concerns. Ullman (1983) criticised the narrow understanding of security in military terms and proposed a broader approach that includes multiple dimensions – military, political, economic, societal, environmental – and at various levels – system, state, individual. Critics of this broad security approach fear that it could lead to conceptual confusion; that it lacks empirical ground; that analyses are not methodologically sound; and that environmental matters should not be militarised (Rønnfeldt, 1997:474).

In the early 1990's the second generation academics, as represented by the Toronto Group's work on the Project on Environment, Population and Security under the direction of Homer-Dixon, responded to some of the criticisms, especially the issue of insufficient empirical evidence. Homer-Dixon (1999) claims to have found a conclusive link between environmental change and conflict:

..scarcities of critical environmental resources – especially cropland, freshwater and forests – contribute to violence in many parts of the world. These environmental scarcities do not cause wars among countries, but they can generate severe social stresses within countries, helping to stimulate sub-national insurgencies, ethnic clashes and urban unrest. Such civil violence particularly affects developing societies, because they are, in general, highly dependent on environmental resources and less able to buffer themselves from the social crises that environmental scarcities cause (Homer-Dixon, 1999:12).

Homer-Dixon (1999) illustrates this by referring to the situation that arose in South Africa where severe land, water and fuel-wood scarcities drove millions of impoverished people from the former homelands into distressed squatter settlements around major urban areas. These settlements, often situated on the worst urban land, also lacked basic services contributing to interethnic rivalry and conflict among settlement warlords and their respective followers. In Pakistan urbanisation, due to environmental shortages and mal-distribution of good land, encouraged millions of the rural poor to migrate into major cities like Karachi and Hyderabad, resulting in fierce competition, and often violence, over resources and basic services. Land scarcity in Chiapas, Mexico, led to violent insurgencies by Zapatistas, which destabilised the Mexican economy and was instrumental in triggering a peso crisis. Turmoil of this nature jeopardises a country's transition to a stable prosperous economy (Homer-Dixon, 1999:12).

Gleditsch (1998) questions the links between environmental degradation, resource scarcity and armed conflict on various grounds, the most important being that important variables are neglected in the analysis, notably political and economic factors which have a significant influence on conflict. In line with cornucopian theory, Gleditsch does not support the concept of unavoidable resource scarcity. In densely populated areas innovation will overcome scarcity as a result of human ingenuity. Increased competition over the same limited resources will also result in greater cooperation rather than conflict (Gleditsch, 1998:382).

Liberal argument and political ecologists point out that the situation in South Africa was the result of much political and economic causality, which mediated the influence of resource and environmental factors (Gleditsch, 1998:382).

Cornucopians focus mainly on environmental degradation, overlooking supply, demand and distributional sources of resource scarcity. Neo-malthusians maintain this approach overlooks such key interactions as *resource capture* and *ecological marginalisation*. Resource capture occurs when resource degradation and population growth interact and powerful groups seize control of resources and distribution in their favour, leading to conflict. The Toronto group argue that in developing countries like South Africa and its neighbouring countries the fundamental issue is a scarcity of renewable resources and that any analysis should incorporate all sources that interact to create scarcity and eventually lead to conflict (Schwartz *et al.*, 2000:79-80). As pointed out before, cornucopians maintain the link between scarcity and conflict is exaggerated, because human inventiveness will in the face of scarcity show capacity to overcome scarcity (Gleditsch, 1998: 383-384 and 395).

The Toronto Group bases their approach on two fundamental questions: (i) Does environmental scarcity contribute to violence in developing countries? (ii) If so, how does it contribute? (Homer-Dixon & Percival, 1996:12) ?

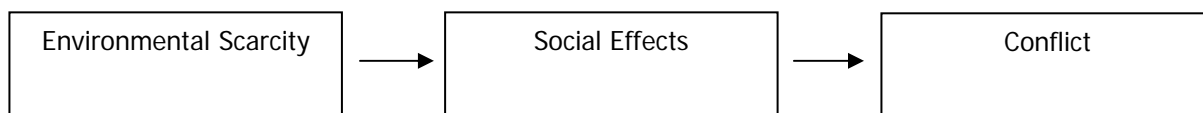


Figure 3: The Toronto Group’s Key Model

(Source: Homer –Dixon & Percival, 1996)

They use examples of case studies to illustrate the complex causality links between the different variables. Environmental scarcities usually have complex causes that interact – supply, demand and structural scarcity. One type of interaction is resource capture, which occurs when powerful groups shift distribution of scarce resources in their favour, to the severe disadvantage of weaker groups. This occurred in Israel where the Israelis placed restrictions on groundwater withdrawals on the West Bank, which affected Palestinian farmers to a much greater extent than Israeli settlers, resulting in a rapid decline in Palestinian agriculture and rising frustration in the

region. Ecological marginalisation is another relevant interaction which occurs when resource-poor people are driven into ecologically marginal areas due to rapid population growth. Further depletion of resources in these marginal areas leads to increased poverty and eventually further migration to urban areas. Examples of ecological marginalisation have affected millions of people in Indonesia, the Himalayas, Brazil, the Sahel etc. (Homer-Dixon, 1999:16). In South Africa thousands of poor black people were forced into the underdeveloped and often ecologically marginal apartheid homelands, where population growth and rapid ecological degradation caused a rapid decline in the availability of scarce resources, which resulted in mass migration to urban areas in South Africa. Here high population density led to further deprivation, and resource capture combined with unfair distribution resulted in violent conflict. The Toronto group found that declining resource supply and increased demand were always intimately connected to uneven resource distribution (Schwartz *et al.*, 2000:79-80).

In an environmentally induced situation of increasing resource scarcity, due to degradation and depletion, increased consumption or inequitable distribution, it is inevitable that inhabitants dependent on these resources will be dissatisfied with the lack of present and future supply. Increased competition among the actors protecting their own interests could eventually destroy the existing resource-sharing arrangement in the developing society, leading to competition between actors that may eventually turn into conflicts and/or migration (Swain, 1996:959). If social and economic adaptation to these scarcities is unsuccessful it leads to weakening of the state, which makes it easier for groups to participate in violent group conflicts. Environmental scarcities can rarely be linked directly to interstate conflict (Homer-Dixon & Percival, 1996: 6-10).

The third generation of researchers, represented by researchers like Gleditsch (1998), Levy (1995), and Hauge & Ellingsen (1998), criticised the work of the Toronto Group on a number of grounds, while acknowledging the value of their contributions towards establishing the links between scarcity and security and illustrating that resource scarcity is never the sole cause of conflict, but is a contributing factor when combined with political, economic and social factors (Rønnfeldt, 1997:476). They criticise the narrow environmental scope of focusing on only scarcity of cropland, forests, fish stocks and water as the independent variables and suggest a broadening of the field of analysis to include socio-political variables. They level criticism

against the Toronto Group's choice of case studies which they deem deterministic, as they all have an element of conflict as a dependent variable. In contrast to the second generation of research they believe the focus should not be on linkages between environmental scarcity and conflict, but should relate to the more general field of peace research in order to gain a better understanding of how conflict may be prevented in the face of environmental scarcity (Rønnfeldt, 1997:480).

Despite extensive scholarly focus on the relationship between conflict and the environment, there is no agreement on the causal mechanisms (Gleditsch, 1998: 382-383). Climate change has so many probable consequences that one could expect numerous probable paths to conflict (Nordås & Gleditsch, 2005:1). The Stern Review (2006) repeatedly stresses the vulnerability of developing countries, and of Africa in particular, to the impacts of climate change. In a draft submitted to the Stern Review Nkomo *et al.* (2006) stress Africa's vulnerabilities:

Africa's vulnerability to climate change largely depends on its current and future adaptive capacities, which are influenced by such factors as the level of economic development, education, access to credit, adoption of technology etc.... These vulnerabilities include the regions high population growth rate (the highest in the world), pervasive and growing poverty, the high prevalence of malnutrition, prevalence of environmental disasters such as floods and droughts, etc.It is the interaction of climate and socio-economic conditions (usually population and GDP) that produces the final impacts (Nkomo et al., 2006:2-4).

Research findings by Homer-Dixon (1994) indicate that environmental scarcities are already fuelling violent conflicts in many parts of the developing world. The violence is generally 'sub-national, persistent and diffuse'. The vulnerability of poor societies is confirmed by the research as the hardship from shortages of water, forests and fertile land inhibits their ability to buffer environmental scarcities and the social crises they cause (Homer-Dixon, 1994:5-6). Homer-Dixon (1994) argues that environmental scarcity combined with social, political and economic grievances in apartheid South Africa led to the upsurge of violence in the townships in the early 1990's. Increased pressure on resources, rising poverty and failed service delivery remains the cause of ongoing civil conflict in urban areas, as was witnessed recently in the Joe Slovo settlement in Cape Town (Mkalipi, 2007). Although social conflict can lead to beneficial changes like redistribution of wealth and land, rapid and unpredictable environmental change

could overwhelm a society's ability to institute constructive reform and lead to fragmentation of institutions or increased authoritarianism.

Homer-Dixon (1994) identifies three scarcity conflict hypotheses: scarcity of controllable resources will lead to *simple scarcity* conflicts; large population movements will result in *group identity* conflicts; and environmental scarcity will increase economic deprivation which could cause *relative deprivation* conflicts (Homer-Dixon, 1994:6).

Simple scarcity conflicts resulting from environmental scarcity are unlikely to cause conflicts between states. States are more likely to clash over non-renewable resources such as oil and diamonds than over renewable resources for two reasons: oil and mineral resources can more readily be converted into state power than can agricultural land, fish and forests. Countries that are most dependent on renewable resources are generally relatively poor and therefore unable to finance aggression. The most likely renewable resource to cause interstate conflict is water, i.e. where there is a dispute over shared river water, especially when there is a military power imbalance between the riparians, as was the case between Lesotho and South Africa and Egypt and Ethiopia (Homer-Dixon, 1994:18-19). After thirty years of unsuccessful water negotiations to divert water from the Lesotho highlands to its arid northern region, South Africa decisively supported a successful military coup in Lesotho, and within months the new government agreed to the construction of the huge Highlands Water Project to meet South Africa's needs. In 1980 Egyptian President Anwar el-Sadat threatened to use military force against upstream Ethiopia if it took any action to restrict Egypt's access to the Nile waters (Homer-Dixon, 1994:19-20).

Cornucopians are more concerned with environmental degradation and economic development rather than with conflict. Their argument is that if resources are globally abundant and can be priced, substituted and traded in order to avoid serious scarcities there is no reason why groups or countries should fight over natural resources. Based on this Beaumont (1997) and others maintain the event of water wars to be unlikely. Cornucopians view the threat of resource wars as a result of scarcity as highly exaggerated and maintain the only scarcity is 'human ingenuity' (Gleditsch & Theisen, 2007:3-5). As the statistics on resource scarcities indicate, this has however not generally been the case in Africa. Poverty, population growth, environmental degradation, weak state structures and brain drain resulting from migration have all combined to

limit most African countries' ability to adapt and innovate to overcome resource scarcities. In a recent index compiled by the Economist Intelligence Unit South Africa has a massive challenge to retain and attract talent to help boost the country's skills shortage. South Africa ranked lowest among 30 countries around the world in terms of attracting skilled people, in terms of nurturing and developing talent overall, South Africa ranked 24th, while countries higher up the ladder continue to attract skilled people away from South Africa, resulting in a gaping skills shortage that does not bode well for growth and stability (Isa, 2007).

Liberal conflict theory links up with cornucopian arguments in maintaining that emerging resource scarcity may encourage co-operation, as two parties sharing a resource may agree that fighting over a resource is more costly than finding ways of sharing it ²⁰(Wallenstein, 1992:47-54). Cornucopian and liberal argument further points to the significance of democratic systems in resource conflict: Democracies are likely to promote resource conservation and sound ecological practices; and press freedom will ensure early warning systems of scarcities which will mobilise countermeasures. South Africa and its neighbours are generally all young democracies, where democratic principles have not yet been well established, corruption is rife, the environment suffers degradation as a result of overexploitation and financial restraints, and freedom of the press is under constant pressure.

The Political ecology approach denies any link between renewable scarcity and conflict, arguing that if any scarcity brings about conflict it would be as a result of political interference, distribution and discrimination. Political ecologists often align themselves with neo-malthusians in their criticism of cornucopian optimism regarding resource scarcity, but they as often criticise pessimistic arguments as to why conflicts arise. They present useful alternatives in the polarised clash of optimists vs. pessimists on the political framework of environmental change (Hartman, 2001; Hildyard 1999; Peluso & Watts, 2001).

²⁰ A point made by the Israeli defence force during the 1982 invasion of Lebanon was that one week's fighting over water would be equivalent to the cost of building five desalination plants with no loss of life, no international pressure and a reliable supply that does not need to be protected in enemy territory (cited in Wolf, 1995).

4.3.4 MIGRATION AS A CAUSE OF CONFLICT

The 2001 Intergovernmental Panel on Climate Change (IPCC) predicts that climate change will induce considerable degrees of environmental degradation that will have an impact on population migration and political conflict. People can adapt to adverse environmental changes by defending themselves or leaving the degraded areas. Developed countries (DC's) are likely to defend against the threats, whereas Least Developed Countries (LDC's) are unable to adapt due to a lack of financial resources and technological skills. People in LDC's may therefore have no alternative but to migrate. There is substantial evidence that population movement caused by environmental scarcity causes further scarcity in receiving areas, which could eventually result in *group-identity conflicts* and *relative deprivation conflicts* (Reuveny, 2005:1).

Group identity conflicts are likely to arise as a result of large-scale environmental migration. As different ethnic and cultural groups are thrust together under circumstances of deprivation and degradation inter-group conflict is likely to result, with a group reinforcing its own identity while insulting and discriminating against 'outsiders'. This migration could shift the ethnic balance in receiving areas, possibly leading to racial strife (Homer-Dixon, 1991:108).

Relative deprivation conflict theories maintain that as developing societies produce less wealth as a result of environmental degradation people will become more and more dissatisfied by the widening gap between their actual level of economic achievement and the level they believe they are deserving of. Lower-status groups will be most frustrated because elite groups will manipulate circumstances to maintain power in order to assure a constant standard of living despite a declining resource pool. At some stage violence may erupt if the disadvantaged groups decide to act violently against the groups they perceive to be the agents of their economic deprivation or if they perceive the disparity in advantage to be as a result of grossly unfair distribution of scarce resources and economic goods. Relative deprivation theories propose that civil strife is likely when there are clearly defined and organised groups in a society; some of these groups consider their level of economic achievement as well as the political and economic system as unfair; and these groups believe all possible peaceful means at effecting change have been exhausted and that there are opportunities to overthrow the existing authority (Homer-Dixon, 1991:110).

Table 5: Comparisons of Conflict Types

| Conflict Type | Objective Sought | Conflict Scope |
|----------------------|------------------------------------------------|-------------------------------------------|
| Simple scarcity | Relief from scarcity | International |
| Group identity | Protection and reinforcement of group identity | International or domestic |
| Relative deprivation | Distributive justice | Domestic with international repercussions |

(Source Homer-Dixon, 1991:112)

The arrival of refugees in an area may not reduce the total resource output, but will probably dilute the existing resources and aggravate a sense of deprivation in the indigenous population. This stress may result in inter-ethnic tension and eventually violent conflict (Homer-Dixon, 1991:112).

Cross-border migration in Southern Africa has a long and complex history. During the apartheid era labourers were recruited on 2-year contracts by employment agencies in Botswana, Lesotho, Swaziland, as well as from Malawi, Mozambique and Zimbabwe (Adepoju, 2003:7). As a result of these long-standing patterns of labour migration, conflict and economic hardship in neighbouring countries, and the pull factors of peace and prosperity in South Africa, the country has become a primary migratory destination (McDonald *et al.* 2000:814).

Theorists disagree on the impact of migration on conflict. While neo-Malthusians and cornucopians argue that migration serves as the complex link between resource scarcity and conflict, liberal and political ecologists maintain that conflict can be prevented in the sending country as well as the receiving country by means of structural, distributional and political practices.

Here it is important to distinguish between refugees and migrants, as migrants are often people who were marginal in their home society and may remain weak in the receiving society, which limits their ability to organise and make demands. Without state backing they often do not have

the power to initiate conflict. Depending on the economy of the receiving country, migrants can have a positive impact on the labour market by easing labour shortages. Diverse countries like Canada and Thailand have displayed a remarkable capacity to absorb migrants peacefully (Homer-Dixon, 1994:21), whereas people in South Africa have been much less tolerant of migrants from neighbouring countries and from countries further north (McDonald *et al.*, 2000:813). Environmental scarcity, combined with economic collapse in Zimbabwe, deprivation in other neighbouring countries and violent conflict, as in Somalia, have ‘pushed’ many to migrate to South Africa in search of a better life.

Much violence against migrants has been the result of varying degrees of xenophobia amongst all racial groups in South Africa and surveys in South Africa indicate an increase in sentiments of intolerance amongst South Africans, regardless of race, education or income. Foreigners are blamed for the rise in crime, the spread of HIV/AIDS, corrupting public officials, and high levels of unemployment – a 1998 survey indicated that 75% of respondents blamed migrants for taking away jobs from local South Africans (Valji, 2003). To cite but a few incidents of violent conflict: In 1995 armed youth gangs in Alexander township outside Johannesburg destroyed the homes and property of suspected undocumented migrants and marched them to the local police, demanding their removal (Croucher, 1998:646). A recent report by the Pretoria-based Zimbabwe Exiles Forum on the plight of refugees alleged that they are subjected to rape, robbery and muggings by local gangs, and exploitation by police and Home Affairs officials (A Cold Reception , 2007). In Cape Town the Somali Association of SA claims that at least 32 Somalis have been killed recently in violent, planned attacks motivated by xenophobic resentment in a turf battle with local businesses (Allie, 2006).

Although a more balanced debate about cross-border migration is taking place in South Africa, in practice stereotyping of migrants of African origin is still very common in all walks of life (McDonald *et al.*, 2000:813).

4.4 XENOPHOBIA – FUELLING CONFLICT

This paper proposes the hypothesis that environmental stress induces people to migrate. Receiving areas experience increased competition over scarce resources, which due to xenophobia results in conflict.

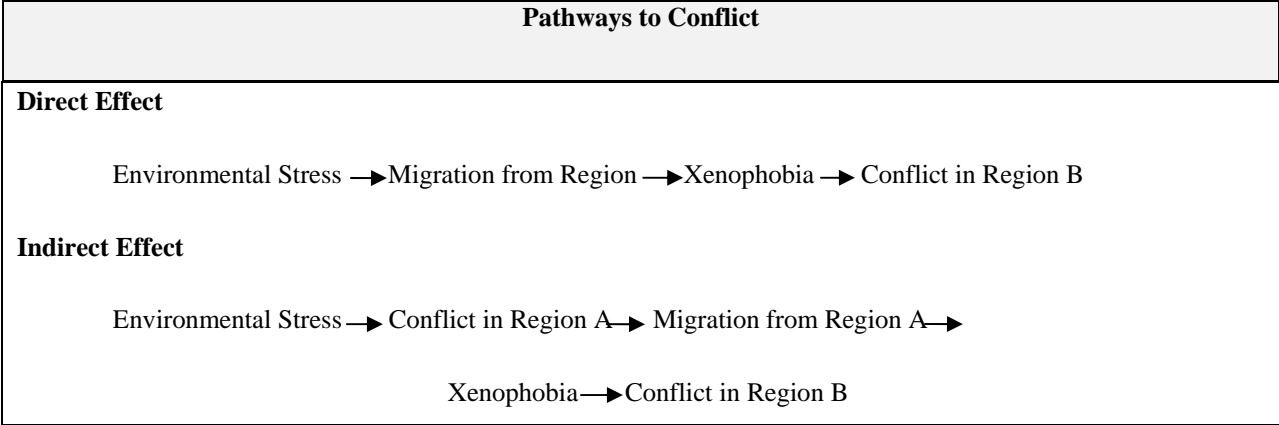


Figure 4: Environmental Stress, Migration, Xenophobia and Conflict: Direct and Indirect Pathways.

Democratic rule in 1994, and the prospects of a booming economy as South Africa re-entered the global market, opened the floodgates for immigration into South Africa from a variety of countries in Africa. From Ghana and Nigeria came highly skilled professionals to staff universities and other professions, tradesmen from Senegal and Mali including small street vendors from the Democratic Republic of Congo and Zimbabwe (Adepoju, 2003:8).

During the apartheid era the black population was united in resistance to one enemy - the white ruling class. After majority rule was instituted in 1994, motivated by high socio-economic expectations, the same black population now vetted their frustrations against immigrants, especially ‘foreigners’ from other African countries. The so-called ‘illegal aliens’ are accused by the local population of being involved in criminal activities, infiltrating the cities, townships and squatter camps and taking away scarce housing and jobs from locals, and undercutting wages (Adepoju, 2003:9).

Xenophobia is a global problem that is experienced in both industrialised democracies of the north and the developing countries of the south, being no less of a reality in Germany, Belgium and the United Kingdom, than in China and parts of Africa. Xenophobia is *a deep dislike of non-nationals of a recipient state embodied in a discriminatory attitude and behaviour towards such non-nationals and often culminating in violence against them, abuses of all sorts and exhibition of hatred*. In its most extreme form xenophobia has resulted in killings and ethnic cleansing in many countries on the African continent, most disturbingly in Rwanda/Burundi, Ivory Coast and South Africa (Mogekwu, 2002).

South Africa prides itself on having one of the most progressive constitutions in the world with a Bill of Rights that guarantees a wide range of basic political, cultural and socio-economic rights to all who are resident in the country. Yet a national survey conducted by the Southern African Migration Project (SAMP) indicates that intolerance is pervasive and growing in intensity. Xenophobic opinions have been expressed not only by members of the general public, but also at the most senior levels of government and policy-making, not least in the South African government's 1999 Draft White Paper on International Migration. Immigration and migration are portrayed as 'problems and threats to be resisted rather than opportunities to be managed' (Dodson & Oelofse, 2000:126).

In November 2000 the international community was shocked by video footage of six policemen setting dogs on three defenceless Mozambican migrants as part of a massive country wide operation to identify and deport undocumented 'illegal immigrants' (Crush, 2000:103-104).

The majority of South Africans believe that immigration and migration impact unfavourably on the country - nearly 60 per cent believe they 'weaken' society and the economy and over 60 per cent that they put a strain on South Africa's resources. Fear of crime, disease and threats to jobs are the leading reasons for opposition to immigration. The 1999 South African Migration Project (SAMP) survey revealed that one third of the respondents would be prepared to personally try and prevent migrants from moving into their area, operating a business, becoming a fellow worker or having their children in the same classroom. These responses could only originate from a citizenry that feels under siege from the outside. South Africans of all races display a distinct aversion to Africans from elsewhere on the continent. Migrants from Southern Africa are viewed only marginally more favourably than those from elsewhere on the continent, which does not bode well for building a regional consensus around migration management within the Southern African Development SADC region. Far from South Africa being a place of tolerance and openness the society displays high levels of societal intolerance towards non-citizens, whether legal or illegal, immigrants or migrants, refugees or asylum-seekers. (Crush, 2000:109-110).

Mizamoyethu informal settlement in Hout Bay, Cape Town, home to 6000 of the poorest class, largely black, who work in a variety of ill-paid jobs such as fishing, gardening and domestic

work, has seen tension between its South-African and foreign-national residents since its inception. Although social and cultural differences play a role, the roots of the conflict are primarily scarcity: 'locals' and 'foreigners', 91 percent from Namibia and 9 percent Angolans, compete for limited employment opportunities, for housing, basic services and facilities, and for simple physical space, and as a consequence 'illegal aliens' have become targets of resentment, hostility and verbal and physical abuse. There are also ongoing tensions between the Mizamoyethu residents and the surrounding residents of 'white' and 'coloured' Hout Bay (Dodson & Oelofse: 2007:125-134).

At a mediation meeting, following an armed battle between foreigners and about 1000 locals demanding the total removal of all foreigners from the settlement, locals listed some of their main complaints about the migrant community, which confirmed the findings on other xenophobic clashes, as follows:

Immigrants/migrants are mostly illegal and drain the community's and the country's scarce resources, they take jobs away from South Africans by undercutting local wage rates, accepting inferior employment conditions, and refusing to unionise; migrants are perpetrators of violence and assist those guilty of violent crime to evade arrest; migrant numbers keep expanding as they encourage friends and family members to migrate; these foreigners have no interest in maintaining or improving the physical environment of the community, etc. (Dodson & Oelofse, 2000:135).

The local residents who display a positive attitude towards foreigners made comments like 'They are Africans like us' and 'They helped liberation fighters'. Regular interaction between the two groups ranges from casual street encounters to social interaction in shebeens, on the sports field and at work. While antagonistic in theory it appears that South Africans are able to be better neighbours than their expressed attitudes would suggest. A factor that may have contributed to improved relations could be a reduction in newcomers to the community as a result of legal restrictions on in-migration to the settlement from whatever source. The established residents regards the *arrival* of any newcomers as problematic and not their *origins* – where people have come from is less significant than the fact that they have arrived at all, which may indicate that conflict is mainly caused by increased competition over scarce resources, and xenophobia

provides the spark to ignite this conflict. The conflict in Mizamoyethu must also be interpreted within a broader national and regional context as part of a process of rapid urbanisation that crosses national boundaries – people escaping poverty in search of a better life, pitting South African and foreign in-migrants against each other and locals in competition for limited socioeconomic opportunities. As long as South African urban in-migrants and foreign African immigrants continue to be socially and economically marginalised, competing over limited opportunities in an environment of disadvantage and poverty, the likelihood of conflict will remain (Dodson & Oelofse, 2000:143-147).

4.5 CONCLUSION

Given the disparate findings and relatively limited systematic empirical evidence, deductions regarding climate change, resource scarcity and conflict must be formulated with caution. Climate remains unpredictable and although there is general consensus that human activity has an impact on global climate, the gross effects are still unknown.

Empirical evidence partially supports the hypothesis that environmental scarcity increases economic deprivation, disrupts social institutions – especially the state - and causes deprivation conflicts (Homer-Dixon, 1994:24). Environmental scarcity intensifies financial and political demands on governments. In order for analysts to understand the complex links between scarcity and conflict it is essential to understand the relationship between state and society (Percival & Homer-Dixon, 1998:289-295). In South Africa black expectations of change have risen sharply since 1994, but 13 years later, living conditions for many blacks remain dismal.

In-migration leads to added competition over already stressed resources in the receiving area which could result in group conflict fuelled by xenophobia. Class, race and ethnicity interact to create a complex combination of acceptance and discrimination, inclusion and exclusion.

Analysis of such conflict has to consider forces at national regional and even global scale, but the impact is felt mainly at a local level by communities, households and individuals. Any policy interventions need to include all these levels of interaction - from members of local communities, to conflict resolution forums, to international agreements between Southern African Development Community (SADC) member countries regarding migration (Dodson & Oelofse, 2000: 145-146).

Without careful attention to the complex environmental and socio-economic factors that contribute to violence, South Africa may once again get trapped in the deadly spiral of violent conflict of the post-1994 period (Percival & Homer-Dixon, 1998:289-295).

CHAPTER 5

THEORETICAL INSIGHTS AND POLICY OPTIONS

5.1 INTRODUCTION

The Stern Review (2006) points out that scientific evidence is now overwhelming that climate change is a serious global threat that demands an urgent global response. There is still time to avoid the worst impacts of climate change if strong action is taken now. Climate change will affect the basic elements of life for people around the world – access to water, food, and land for agriculture; health and the environment. It will lead to dislocation, migration and conflict (Stern Review, 2006: VI).

That climate change poses a threat to global peace is further borne out by the recent joint award of the Nobel Peace Prize to Al Gore and the IPCC. Commenting on the award Martin Taylor, vice-president of the Royal Society, said: ‘Climate change is one of the most significant issues of our times and one which has major implications for global security as well as our personal health, wealth and well-being’. The IPCC has warned that ‘societies’ fault lines could be ripped open by armies of environmental refugees, and countries could be tempted to take the path of war as they grab rivers and aquifers to ensure their population’s survival’. Jeffrey Sachs, director of the Earth Institute at Columbia University, cites the war in Sudan’s Darfur as an example of climate change driving a badly-stressed region over the brink: ‘We’re going to see a lot of that in the future, because there are a lot of poor, fragile, conflict-ridden or conflict-prone areas, especially in the dry-lands, that are likely to be in the line of fire, as it were’. Britain’s International Institute for Strategic Studies recently warned of the risk of conflict: ‘The security dimension will come increasingly to the forefront as countries begin to see falls in available resources and economic vitality’ (Ingham, 2007). All countries will be affected, and therefore the response has to be international. It must be based on a global vision of long-term goals and agreement on frameworks that will accelerate action over the next decade, and it must be based on mutually reinforcing initiatives at national, regional and international level (Stern Review, 2006:vi-vii).

The Stern Review (2006) points out that the science of climate change is reliable and the direction is clear, but due to the non-linear nature of climatic change, what is unclear is when and where impacts will occur and with what intensity (Stern Review, 2006:iv). The findings of the IPCC are tentative, representative of the huge uncertainty inevitable in the study of a mechanism as complex as the climate (Al Gore and the Intergovernmental panel..., 2007).

5.2 THEORETICAL INSIGHTS

As is apparent from our theoretical analysis there are also conclusive findings on the impacts of climate change on resource scarcity or human security. In line with the Stern Review (2006) neo-malthusians and cornucopians are in consensus that resource scarcity, regardless of the causes, leads to conflict, which could result in migration and further conflict in receiving areas. Liberals and political ecologists believe that conflict in both sending and receiving areas can be avoided by cooperation, fair distribution and sound political practices.

In order to diminish the impacts of climate change, Stern points out that what is required is adaptation, mitigation and governance. The main mechanisms of mitigating the effects of climate change would include: sustained and predictive research, the development and implementation of measures to promote equity and sustainable development, and increasing the capacity of developing countries to deal with natural disasters (Mawadza, 2007).

Based on the theoretical arguments put forward in this paper, the aim will now be to determine what policy options for adaptation, mitigation and governance would be most likely to reduce the harmful impacts of climate change on vulnerable regions and groups of people in South Africa and neighbouring countries in order to contain migration and lessen the likelihood of violent conflict.

5.2.1 THEORETICAL INSIGHTS ON PREVENTING RESOURCE SCARCITY

Neo-malthusians predict resource scarcity and environmental degradation as a result of population growth. Scarcity of essential resources is not a rare phenomenon in Africa. The regional resource statistics give a clear indication of current food, land and water scarcities in South Africa and in neighbouring states. The most important way to overcome this scarcity within the neo-malthusian framework is to control population growth in order to lessen the

demand on limited resources. The authorities could offer financial benefits for families with fewer offspring, or impose penalties, but it would be difficult to impose such measures in African societies where large families are an integral part of most cultures and are seen as a guarantee against poverty in old age. African society has been constructed so that high fertility and large surviving families have usually been economically and socially rewarding (Caldwell & Caldwell, 1987:410).

From a cornucopian perspective Gleditsch & Theisen (2007) suggest that the pessimistic apocalyptic scenarios forecasting global scarcities, mass deprivation, and major interstate and intrastate violence are questionable, as global predictions of scarcities have possibly been exaggerated (Gleditsch & Theisen, 2007:14-15). Africa for a number of reasons lacks the ingenuity and inventive skills cornucopians rely on in their theories to prevent resource scarcity from developing. Cornucopians suggest adaptive measures such as substitution and recycling, but they do not account for scarcities such as water and fish stocks that cannot be replenished or that have become depleted as a result of climate change, rather than because of human exploitation. Rain-fed maize harvests in South Africa have dropped dramatically as a result of extreme drought in all the major maize growing regions resulting in a short-fall of approximately 1.5million tons for the 2006/2007 harvest (MNR, 2007) and West Coast fishing communities are finding it increasingly difficult to make a living as a result of changes in the Benguela ecosystem due to the warming trend of the Benguela current (Gosling, 2007). As pointed out by the Stern Review (2006) urgent adaptation is the only solution to the most immediate impacts of climate change. The most vulnerable people in South Africa and the neighbouring states lack the ingenuity to adapt to the massive impacts of climate change on their livelihoods. Traditional practices are unable to contend with the dramatic effects of climate change. Not only are there high levels of adult illiteracy and a lack of world class tertiary educational facilities, but there is a constant brain drain to developed western countries. Cornucopian theorists point out that human ingenuity is required to overcome scarcity through innovation and adaptation. The employment prospects on the West Coast are limited in terms of using the natural resources, and West Coast communities urgently need to change their livelihoods. Where the livelihoods of entire communities are being threatened the authorities and NGO's should step in with adaptive measures. Effective governance could for instance offer tax incentives to encourage players in the industrial sector to relocate production to environmentally stressed areas to create

employment. In water stressed areas adaptive measures could be taken to introduce more drought resistant crops.

Liberal theorists rely on cooperation to overcome scarcity. Developing countries will not for the foreseeable future be able to afford or be able to develop the technology for mitigation against climate-induced change, and will have to rely on the financial support and cooperation of the international community for technological innovation. It has been estimated that if Sub-Saharan Africa continues to produce crops based on current agricultural practices, the cereal shortage will amount to approximately 90 million tons by the year 2025. In the long run effective governance can eliminate corruption so that food distribution reaches the people it was destined for (political ecologists identify unfair distribution as a primary cause of scarcity and a source of conflict), and roads and rails can be built to transport the food, but this will take time and will require large financial investments. In the meantime introducing genetically modified crops that give higher yields can be supplied to subsistence farmers to alleviate food scarcity, while scientists at the University of Cape Town, the Council for Scientific and Industrial Research (CSIR) in Pretoria and Kenyatta University in Kenya continue their efforts to perfect drought resistant GM crops of African staple foods such as maize, cassava, soybean, yams sweet potatoes, which are life sustaining in different parts of Africa (Thomson²¹, 2007).

In order to prevent land degradation which leads to scarcity authorities and NGO's could educate subsistence farmers to develop sustainable farming methods, alert them to the dangers of deforestation, encourage them to rotate their crops in order to prevent the soil from being depleted of nutrients and assist rural communities in arid regions to dig wells to access ground water. Africa is particularly vulnerable because so much of its agriculture is dependent on rainfall rather than irrigation.

5.2.2 THEORETICAL INSIGHTS ON CONTAINING MIGRATION

As reported in the Stern Review (2006) by the middle of this century approximately 200 million people may become permanently displaced 'climate refugees'; millions of which will be on the

²¹ Thomson is a professor in the Department of Molecular and Cell Biology at the University of Cape Town

African continent (Stern Review, 2006:77). Theorists disagree on the impact of migration on conflict. While neo-malthusians and cornucopians identify migration as the complex link between resource scarcity and conflict, liberals and political ecologists argue that sound structural, distributional and political practices can prevent conflict in the sending country as well as the receiving country by means of structural, distributional and political practices.

Neo-malthusians are pessimistic about the prospects of preventing resource scarcity and therefore they do not offer strategies to counter migration. Political ecologists do not contribute insights into the migration debate as they focus on the structural features and distributional aspects of resource scarcity, which they believe to be the true causes of conflict. Cornucopian and liberal theories do however offer a few creative insights that could lead to measures to contain migration by means of adaptation, cooperation, mitigation and governance.

South Africa has a long history of internal migration as well as migration from neighbouring countries. South Africa's 7000 km border is extremely porous and it is very difficult to monitor movements across the expansive borders (Crush, 1998:2). From a realist perspective there are calls for fortified borders and even suggestions that the apartheid-era electrified fences should be reactivated. With the increased influx of Zimbabweans into the country in recent months border farmers from the Limpopo province are conducting vigilante patrols, rounding up border-crossers and handing them over to the police for deportation. Estimates vary, but the Department of Home Affairs released figures indicating 100 000 Zimbabweans were deported between January and July of 2007 (SAPA, 2007). Such actions are in direct conflict with the South African Bill of Rights and the government's commitment to equality and fundamental human rights (Crush, 1998:1). While such extreme measures would in any event not prevent, but only stem migration, it would also contradict the aims of cooperation and integration that are central to the objectives of integrated regional development of the New Partnership for Africa's Development²² (NEPAD) and the African Union²³ (AU).

²² NEPAD is a pledge by African leaders, based on a common vision and a firm and shared conviction, that they have a pressing duty to eradicate poverty and to place their countries, both individually and collectively, on a path of sustainable growth and development and, at the same time, to participate actively in the world economy and body politic. <http://www.nepad.org>

Cornucopian reliance on ingenuity and adaptive skills does not offer a solution to stem migration in Southern Africa in the near future, as developing skills and ingenuity requires time and long-term investment. The liberal paradigm based on cooperation could be useful to prevent developed countries from attracting professionals and people with special skills, to emigrate from developing countries with the promise of attractive packages and high wages. Speaking at the 25th anniversary meeting of the Institute of International Finance in Washington DC South African Foreign Minister, Trevor Manuel (2007), accused western countries of ‘plundering’ critical skilled professionals from the developing countries, saying this severely hampers their growth and delivery of services to poor countries, making it that much more difficult for developing countries to reduce poverty and attain their development goals (Manuel, 2007). On the other hand developing countries should simultaneously invest in creating circumstances that value and reward skills and serve to retain skilled persons and attract skilled emigrants to return to boost the national reserves of ingenuity and turn the ‘brain drain’ into a ‘brain gain’.

Deputy Foreign Minister, Aziz Pahad, recently highlighted the importance of cooperation: ‘If we don’t begin to assist the Zimbabweans to solve their problems, the flow into South Africa, Mozambique, Zambia and other neighbours will increase. It is in our interest, nationally and morally, to see what we can do to facilitate’ (Momborg, 2007).

5.2.3 THEORETICAL INSIGHTS ON XENOPHOBIA AND CONFLICT

Referring to predictions in the Stern Review (2006), Margaret Beckett (2007 b) pointed out that migration on an unprecedented scale and in areas of already high tension and where resources are already stretched to the limit, will lead to disruption on a scale not seen since the end of World War 2 (Beckett, 2007 b).

²³ Among the objectives of the AU as stated in the Constitutive Act are the objectives to: achieve greater unity and solidarity between African countries and the peoples of Africa; accelerate the political and socio-economic integration of the continent; promote and protect human and people’s rights in accordance with the African Charter on Human and People’s Rights and to promote cooperation in all fields of human activity to raise the living standards of African peoples <http://www.au2002.gov.za>

Having identified xenophobia as a spark that could ignite violent inter-group conflict it would be useful to gain some theoretical insight into reducing group prejudice and attaining group cooperation through inter-group contact.

Neo-malthusians have very limited insight into group conflict as they believe the problem is technical i.e. a matter of supply and demand and therefore containing population growth. To them it is purely a resource problem and not one of social interaction, social identities, subjective perceptions, attitudes and dispositions. Cornucopians also have a technical approach to scarcity and conflict. To them the solution lies in finding more effective devices for more efficient use of scarce resources, better production methods, innovation and ingenuity. They too reduce the root cause down to being a resource problem and not one of social interaction.

Liberals insightfully identify the problem as being one of complex social dimensions: interaction between *strangers* who are wary and even afraid of one another, leads to the emergence of prejudice once social contact is made. Liberals do propose a remedy for the problem of prejudice: the eminent social contact hypothesis of Gordon Allport (1954).

Pettigrew and Tropp (2006) conducted a meta-analytic test of inter-group contact theory, and based on 515 studies the meta-analysis concluded that inter-group contact reduces inter-group prejudice (Pettigrew & Tropp, 2006: 751-783).

Allport's (1954) influential formulation of inter-group contact theory was introduced in *The Nature of Prejudice* and is a measure of the manifestation of prejudice in a society. His inter-group contact theory maintained that contact between groups under optimal conditions could effectively reduce inter-group prejudice. In an optimal situation four elements would be present: equal status between the groups in the situation; common goals; inter-group cooperation; and that these conditions of contact have the support of authorities, law or custom (Pettigrew & Tropp, 2006:752). Although it is not a prerequisite for all of Allport's factors to be present to produce a positive reduction in prejudice, they do act as facilitating conditions that improve the potential for positive outcomes. These elements would mostly appear to be present in the example of inter-group cooperation on the sports-field in Mizamoyethu. The research of Pettigrew and Tropp (2006) also suggests that 'familiarity breeds liking', and that the increases in acceptance that derive from exposure can generalise to greater liking for related yet unknown

individuals. This point is well illustrated by the fact that rural white Afrikaans housewives who had close contact with their African domestic workers, also had more positive attitudes towards Africans in general. This clearly suggests that positive contact leads to a reduction of uncertainty, which reduces inter-group anxiety and feelings of fear. Reducing such negative feelings represents an effective mechanism by which inter-group contact diminishes prejudice (Pettigrew & Tropp, 2006:753-767).

The framework of the contact theory presents many creative opportunities for authorities and NGO's to establish optimal situations for inter-group interaction in order to at least reduce, if not eliminate, prejudice. The need for authorisation and legitimacy also affirms the necessity for local and national authorities to discard prejudice, adopt a positive approach to migrants instead of framing migration as a 'threat' or a 'problem' and to refrain from employing negative and provocative terminology in official documents, such as 'illegal aliens'.

Political ecologists approach the problem of group conflict from an administrative and ethical/legal perspective. They believe conflict is generally a result of political interference and the resulting unfair distribution of resources, which leads to relative deprivation conflicts.

This approach links up with the concept of distributive justice expressed in the phrase 'justice as fairness' as developed by Rawls (1993) in his theory of justice. The theory consists of two principles: the liberty principle: that all have the greatest degree of liberty compatible with like liberty for all; and the difference principle: that social and economic inequalities be attached to positions open to all under fair equality of opportunity and to the benefit of the least privileged members of society. Rawls (1993) refocused his theory in *Political Liberalism* in which he attempts to show that his two principles of justice form a 'theory of the right' as opposed to 'the good' which would be supported by all reasonable individuals even under circumstances of pluralism. Rawls introduced the idea of 'overlapping consensus' over justice (agreement between citizens who hold different religious and philosophical views), as well as the idea of 'public reason' (the common sense of all citizens) (Rawls, 1993:11-15). This approach is compatible with the liberal theory of political ecologists who maintain that without political interference in the distribution of public goods the process would be fair and equitable and disparate groups would not compete over scarce resources and access to services. Rawls

proposes the view of justice that people with conflicting but reasonable ideas would be able to agree to regulate the basic structure of society, and avoid conflict.

5.2.4 THEORETICAL CONCLUSIONS

It is apparent that there is no single theoretical approach that can be applied to gain a better insight into the complex link between resource scarcity and conflict. The different theories are mutually compatible and each theoretical perspective contributes a partial elaboration to and additional insights into the climate change/conflict hypothesis. There is possibly room for a new theoretical approach to gain a better understanding of the complexity and the uncertainties that are inherent in the study of a mechanism as complex as climate change.

5.3 SOUTH AFRICAN CLIMATE CHANGE INITIATIVES

South Africa as a non-annex 1 country under the Kyoto Protocol is not required to reduce its greenhouse gases, but as a signatory to the UNFCCC has to fulfil certain obligations. In order to fulfil these commitments the Department of Environmental Affairs and Tourism has developed a national climate change response strategy. The objective of this strategy is to support issues that have been identified as priorities for dealing with climate change in South Africa, while still achieving sustainable national development objectives. There is a considerable degree of compatibility between national government objectives, sustainable development and climate change. It is clearly stated in the IPCC Third Assessment Report that sustainable development objectives are achievable that also benefit climate change mitigation, even if climate change was not the primary reason for taking action. While recognising international realities, including pressure for quantified commitments from developing countries, policy objectives have to be seen within the present economic realities of the country and the inequitable distribution of global wealth (South African National Climate Change Response Strategy, 2004).

5.3.1 SOUTH AFRICA AND THE STERN REVIEW

At a level of recognition generally reserved for senior statesmen, Sir Nicholas Stern was invited to address a full meeting of Cabinet during his visit to South Africa in March 2007. Stern once again stressed that Africa would be one of the continents hardest hit by climate change as it had the least capacity to respond. South Africa was well placed to shape the international debate on

climate change. With a global profile on the issue, and being one of the Group of Eight plus five (G8+5)²⁴ countries, SA was in a position to influence international debate on important issues (van Gass, 2007).

The SA Minister of Environmental Affairs and Tourism stated that ‘The Stern Review takes the climate debate to the next level especially by considering sensible policy responses, and very importantly, what is equitable for future generations’ (Van Schalkwyk, 2007). SA is prepared to take on its share of these challenges to avoid an unsafe climate future and inadequate adaptive responses. South Africa is also ever mindful of the key message of the Stern Review (2006): the earlier action is taken, the less costly it will be in the long run (van Shalkwyk, 2007).

A central message from the Stern Review (2006) is that action on climate change also holds opportunities for investment and gives impetus to businesses and governments to begin exploring new sources of competitive advantage in clean and renewable technologies, creating access to cleaner energy for development, reducing air pollution and improving health and food security. In an address at the South African Institute for International Affairs (SAIIA) at the University of the Witwatersrand, Stern pointed out opportunities in agriculture, developments in low-carbon technology, the projected \$20-billion to \$40-billion carbon-trading market, plus the opportunity to play a leading role in researching and developing the issue of carbon capture and storage, etc.(Creamer, 2007).

South Africa has taken heed of Stern’s closing remarks at SAIIA: “The planet has reached the point where the only way to carry on with a ‘business as usual’ approach is to be absurd and deny the science, reckless and say humanity will adapt to whatever will come its way, or you can be unethical and say you are not bothered about the future” (Creamer, 2007).

²⁴ G8+5 group consists of the heads of state from Canada, France, Germany, Italy, Japan, Russia, the UK and the USA, plus the heads of state of the 5 leading emerging economies: Brazil, China, India, Mexico and South Africa. The group was formed at the G8 summit at Gleneagles in 2005, in the hope that this would form a stronger and more representative group to inject fresh impetus into the Doha trade talks and to achieve greater cooperation on climate change (www.blacklabel.co.za)

5.3.2 POLICY OPTIONS

Despite the ambiguity of past environment-conflict research there is common agreement that there are links between environmental change and violent conflict. However it has not been established that environmental factors are the only or most important factors leading to conflict. Complex interaction between climate and socio-economic factors, poverty, inequities between groups, ethnic tension, institutional resilience, state legitimacy and its capacity and willingness to intervene, seem to be as important if not more than environmental change (Baechler, 1999:76-112). It has also been demonstrated that environmental factors do not lead to open conflict between nation-states. Thus conflicts, in which environmental change appears to be a contributing factor, tend to be within rather than between states and it is this intra-state level that climate-change conflict policy decisions need to be made and where a research agenda would be most profitably focused (Barnett, 2001: 5).

The political and economic structure of the state is critical in preventing environmental conflicts. It can be argued that the levels of wealth in the industrialised developed world allow for institutions that provide stability and resilience to environmental change. Well-financed government, the insurance industry, transport and communications infrastructure, democratic participation, and a base level of personal affluence all help hedge against turmoil in the times of environmental stress. Finally, trade between similarly affluent liberal democracies facilitates the transfer of essential foodstuffs and technology that increase resilience and lessens the chances of crises developing within states. Therefore, relative to developed states, developing countries must contend with more potentially conflict-inducing environmental changes (Barnett, 2001:6). Climate change has the potential to undermine economic development, increasing poverty and delaying or preventing the realisation of the Millennium Development Goals (MDG's) (UNFCCC, 2006:32). Although the developed countries affirm their commitment to ensuring human security through sustainable development they have failed to successfully address poverty in Africa. Donor countries should be encouraged to deliver on their promises of aid and to work to better integrate climate change adaptation in development planning and assistance to ensure that maximum impact is obtained from donor funds. South Africa should appeal for assistance to improve the technical capacity for climatic data collection to develop early response mechanisms and improved, proactive, timely broad-based information systems, in order to assist rural

communities to adapt to climate change stresses. The most pressing needs in order to increase the capacity of African countries in climate science and adaptation, relate to a general lack of knowledge and expertise. To address these shortcomings South Africa should seek assistance to establish training programmes for local government officials, dedicated research facilities and post-graduate courses. In order to implement future adaptation options better links are needed between climate research and policy-making, mainstreaming climate change consideration into development plans and programmes, education and awareness-creation in governments, institutions and individuals, and better forecasting (UFFCC, 2006:46-48).

We have also established that strong states are more able to encourage collective action as mitigation against debilitating conflicts among heterogeneous groups. They have effective administrative structures and have legitimate control over the use of force, which helps manage potential internal challengers. They also have the capacity to mediate impending conflicts before they turn violent, such as conflicts arising from perceived inequities between competing groups within states (Barnett, 2001:7). South Africa should encourage the support of the international community, both in Africa and the developed world, for the African Peer Review Mechanism (APRM) which is designed to encourage good governance and transparency, and to eliminate corruption in participating countries²⁵. This would not only generate international confidence in African governance and a possible increase in investment and development aid, but would also result in greater domestic legitimacy and accountability.

As our research has revealed, in many cases of environmentally induced conflicts the movements of people and subsequent inter-group rivalry plays an important role (Homer-Dixon 1999, Percival and Homer-Dixon 1998, Swain 1996). Most migration occurs between and within developing countries as a result of a complex set of factors. Identity conflicts are not a natural outcome of inter-group mixing, but rather a product of political forces. Identities are malleable constructs and it is the political response to migrants that is most important. The receptiveness of national and community leaders is essential for peaceful adaptation and settlement. For countries already dealing with large influxes of migrants, and those likely to receive increasing

²⁵ The APRM process is to assist countries to develop and promote laws, policies and practices that lead to: political stability, high rates of economic growth, sustainable development, and continental economic integration. www.aprm.org.za

numbers as a result of climate change, strategic assessment and forward planning for the absorption of climate immigrants should be a policy priority. Closing out migrants would be only marginally successful and morally unacceptable therefore it would be more effective to institute a policy of controlled acceptance and resettlement of migrants together with the promotion of racial tolerance domestically (Barnett, 2001:8-9).

In addition South Africa should, in conjunction with neighbouring countries, develop controlled migration policies in order for all countries to gain maximum benefit from the process – either through resulting economic growth in the receiving country or through remittances to the country of origin. Migrants should be de-stigmatised in official terminology and a concerted effort should be made to eliminate xenophobia and all forms of persecution and prejudice against migrants by officials. Local authorities should be encouraged to create forums for equal representation and participation by local and migrant inhabitants of the area to encourage interaction and eliminate fear and resentment.

5.4 CONCLUSION

The science of climate change is robust and the findings are conclusive that a ‘business as usual’ path for climate change presents serious global risks. Because climate change is a global problem, it needs a unified global response. It represents the first event in the history of a globalised world that is dependent on global cooperation for the protection of human security in each and every country in a conflict ridden, polarised world.

Although conflict theories regarding the links between climate-induced resource scarcity and human security are inconclusive, they all contribute elements towards a better understanding of the intricate interaction of these complex systems. There is however consensus that developing countries, like South Africa and its neighbours, will be most vulnerable to the damaging effects of climate change, as they lack the skills and resources to institute measures for successful adaptation and mitigation. The region also lacks the strong governance which is required for the successful implementation and management of policies aimed at preventing resource scarcity and managing potential conflict.

Large-scale migration results from environmental scarcity and some schools of thought maintain there is a link between migration and violent conflict. It is our contention that there is not a determinative link between migration and group conflict, but that migration fuels xenophobia which in turn sparks conflict. South Africa has a long history of racial tension and institutionalised division, which is still manifest in most spheres of public and private life. The damaging effects of climate change are bound to lead to an ever increasing influx of environmental refugees into South Africa, and concerted efforts will need to be made to change attitudes and perceptions so that migrants can be gainfully and peacefully absorbed into the socio-economic structures of the country.

The ideal regime should be a unified one that reflects an internationalism, a spirit of global solidarity, and a belief that 'I am my brother's keeper' in order to stop the tide of environmental destruction and enforced climate change, while bringing to an end poverty and underdevelopment and ending wars and conflict, not only to ensure the continued existence of humanity, but also so that humanity exists peacefully and side by side with the environment (van der Merwe, 2005).

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