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CLIMATE CHANGE RESPONSES: DOES THE NATURE OF RISK SOCIETY PREVENT SCIENCE AND POLICY FROM MAKING A DIFFERENCE?

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A research report submitted to the Faculty of Science, University of the Witwatersrand, in partial fulfilment for the degree Master of Science.

Johannesburg, 2008

DECLARATION

I, Gerard Alexander van Weele (Student no. 0418667/W), declare that this research report is my own, unaided work, except where otherwise acknowledged. It is being submitted in fulfilment for the requirements of the degree Master of Science in Geography at the University of the Witwatersrand. It has not been submitted before for any other degree or examination in any other university.

Signature: _____

Date: _____

ABSTRACT

Climate change is a modern global risk and knowledge of it exists mainly in scientific projections. Beck's theory of risk society, as part of the field of social constructivism, implies that in a risk society, responses to risk should result in changes to the fundamental causes of the risks, also known as reflexive change. Climate change science and responses to climate related risks should therefore result in improved understanding of the nature of climate risks and of the fundamental causes of climate risks. In practice, the application of the theory is less clear, and use thereof as an analytical tool difficult, as is shown by a preliminary examination of the official response to climate change in South Africa. The research presented here used the risk society theory to conceptualise a model framework of how responses to risk manifest in modern societies. This framework was then used as reference for a review of the content of the South African national policy response to climate change and an evaluation of comments obtained from some of the actors directly involved with the response. The results indicate that the nature and extent of reflexive change is determined by perceptions or definitions of risk as part of a public, political and academic debate, as well as a reaction to external opportunity costs rather than 'pure' climate change threats. Reflexive change is therefore incidental rather than intentional. On the other hand, perceptions and definitions of risk impact on decisions relating to strategic response directions, such as debates around mitigation and adaptation measures. It also shows that a wider practical application of the risk society is necessary in order to fully understand its relevance in non-European settings.

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LIST OF ABBREVIATIONS

BSE	Bovine Spongiform Encephalopathy
CDM	Clean Development Mechanisms
CFC	Chlorofluorocarbon
CO_2	Carbon Dioxide
DEAT	Department of Environmental Affairs and Tourism
GDP	Gross Domestic Product
ICC	Interdepartmental Co-ordinating Committee on Global Environmental Change
IPCC	International Panel on Climate Change
NCCC	National Committee on Climate Change
NCCRS	National Climate Change Response Strategy
NGO	Non Governmental Organisation
SAR	Second Assessment Report
TAR	Third Assessment Report
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

CHAPTER 1 INTRODUCTION: CLIMATE CHANGE AND RISK SOCIETY THEORY

Risk Society, Reflexive Modernity and Climate Change Responses

As social institutions (including associated social systems, knowledge creation and industry) modernise, they create global risks such as climate change as by-products. The spatial and temporal scales associated with these risks, however, imply that they can usually only be known through scientific assessment that classifies the risks and provides information on them. Lately though, society finds itself in a phase of late modernity, which has achieved a state of flux in which all aspects of society, including science, have become uncertain, unstable, and ultimately self-critical (Beck, 1992). The freedom for self-criticism actually allows science to criticise its own foundations and reasoning, creating uncertainty about which scientific opinions are more relevant and legitimate in the process. It leaves society with contradictory, yet equally legitimate, scientific opinions that can then be applied in contexts where they would support specific interests. Different stakeholders in the climate change arena, for example, can argue the merits of their particular case, based on selected scientific findings. Uptake of a particular viewpoint in terms of government regulation or self-regulation will therefore most likely be related to the interests being served or the success of the dissemination of the particular knowledge or opinion.

Regulatory responses to climate change and related policies could therefore possibly be mere reactions to particular interests or pressures, as opposed to objective and practical guidelines that are devised to best reduce risks (Hajer, 2003). The question is: Can policies be separated from the influences that shape and configure them and can policy, and implementation of policy, objectively guide responses to issues, or are there structural aspects inherent in the modernisation framework that impose limitations on the scope and effectiveness of response strategies in modern society, and especially in modern developing states? If so, are there specific aspects that need to be addressed or changes to be made?

The expected immediacy of the threat of global climate change has made the climate change debate one of the hottest topics of global discussion due to the potential social and economic implications associated with the inevitable need for

local and global responses (IPCC, 2007; 2008). Climatic change is a natural phenomenon, but scientific consensus has shown that we can expect fairly rapid climatic changes during the next century due to recent anthropogenic forcing of the climate system's energy balance (IPCC, 2007). It can therefore be described as a very 'modern' phenomenon, and typical of the type of modern global risk that the German sociologist, Ulrich Beck, considered sufficient to spark the onset of a new modernisation process as explained in his social theory of 'risk societies' (Beck, 1992; Beck, 1999).

Beck published his perspective on post-modern society and environmental politics as a thesis on risk society in 1986 in his book *Risikogesellschaft: Auf dem Weg in eine andere Moderne* (appearing as an abbreviated English version in 1992 titled *Risk Society: Towards a New Modernity*) (Beck, 1992). In the theory, he argued that the emerging social and political arenas are subject to a particular complexity due to the fact that risks are produced by and benefit specific interests, yet the consequences are often systemic and hard to measure and therefore require new forms of responses. Since then a debate has grown around the question of whether our current social context can be fully, or at least better understood by reflecting on it as a society functioning on the premise of decision-making based on risk perceptions (Dessai *et al*, 2004; Demeritt, 2006; Leiserowitz, 2006).

Beck has drawn a fair amount of criticism – mainly directed at his application of specific concepts such as reflexivity and also the less concrete solutions offered by his thesis (further discussion of these criticisms is provided in Chapter 2) – but offered strong enough re-conceptualisations of society for it to remain a credible framework for analysis of the modern social context (Mythen, 2007). In fact, the Fourth Assessment Report from the Intergovernmental Panel on Climate Change (IPCC) draws on a risk management perspective both to bring its findings regarding the expected climate change impacts down to a practical response level, and to inform its uncertainty classifications (IPCC, 2007). Evidence of this can be found in Topic 5 of the IPCC Synthesis Report which states:

> *"Decision-making about responding to climate change involves an iterative risk management process that includes both mitigation and adaptation, taking into account actual and avoided climate*

change damages, co-benefits, sustainability, equity, and attitudes to risk" (IPCC, 2008).

In brief, the risk society thesis tenders the following perspective on modern society:

- Society modernises to a point where supranational risks are created as by-products of modernisation, and globalisation become all-pervasive.
- Reflexivity emerges as a universal theme, in the sense that many elements of modernity unintentionally and unseen become both the cause for, and solution to their own disintegration.
- Reflexivity eventually becomes increasingly self-critical and reflecting, and intentional risk response becomes possible on all levels and in all spheres of society[1].
- Globalised risk management subsequently erodes the sovereignty of the nation state by simply widening the scope of social action beyond its reach.

Ultimately, what Beck was alluding to is that along with the exponential growth of the technological modernisation era came environmental issues of similarly growing global universality, but at the same time also environmental risks that are time delayed with latent or diffuse causes. In response, the new phase of modernisation is undergoing a transition from production of wealth to the distribution and management of risks (Beck, 1999). Society has only three response options – denial, apathy or transformation (Beck, 2006). The third option requires a 'new' modernisation because the existing institutions of society are incapable of effectively coping with or responding to the new wave of projected universal risks. Ecological modernisation, as a general example of such a modern response strategy, strives to direct global market strategies and regulatory practice in a way that reduces modern environmental risks, thereby

[1] Application of the terms reflection and reflexivity is contested, and the various meanings are unpacked further in Chapter 2 and Chapter 3.

changing the nature of the risk in ways that were never possible previously (Mol, 2001; Barry and Paterson, 2004; Jänicke, 2008).

Beck's thesis on risk society can therefore offer opportunities to better match climate change response strategies to the realities of a modern society. For example, a globalised risk perspective with related innovative cross-boundary response mechanisms will serve the needs of a society that faces global problems and changeable ecological politics, yet remains limited to local implementation actions.

Research Aim

Beck himself identified global warming as an example of a recently conceptualised and globalised manufactured risk (Beck, 2006). Social comprehension of human-induced climatic forcing can therefore be used as a proxy of the way in which modern risks are responded to by post-industrial society.

This research report is an attempt to investigate the practicalities of a real-world application of the risk society theory in a developing country, namely South Africa, by using the South African national climate change response as medium. In particular, the focus will be placed on what a risk society perspective can illuminate about some of the interfaces between scientific knowledge and policy making. The general climate change debate therefore represents the broader context and subject field, but a detailed review of the South African National Climate Change Response Strategy (NCCRS) (South Africa, 2004) is used as localised case study to:

1) establish whether the risk society theory offers a framework to which risk responses conform;
2) determine to what extent the South African strategy fits the description of a risk response; and
3) identify aspects of the risk society framework that might limit and/or enable further direction to climate change responses through structural influences on knowledge creation and its use in policy formulation.

Furthermore the research records, as a matter of course, the extent to which the pure application of risk society concepts can be assumed within the modern social context of a developing nation in the global South. Further details of research objectives and methods are outlined in Chapter 4 and Chapter 5.

The interdisciplinary nature of risk society theory, however, means that the research also touches on related themes such as ecological modernisation (Cohen, 1997, Murphy, 2000, Barry and Paterson, 2004), reflexive modernity (Giddens, 1990), political ecology (Greenberg and Park, 1994), constructivism (Demeritt, 2001) and social-economic resilience (Folke, 2006). The shared idea is that formal and informal political processes shape perceptions and responses to modern risks (Hajer, 2003). Pielke Jr. (2005), for example, shows how the definition of a concept can lead to the politicization of science, Rübbelke (2005) describes how politics can drive response policies, Webster (1999) examines how uncertainties around risk are used within post-modern governance systems and Demeritt (2006) uses Beck's world views to evaluate how scientific knowledge should be used to inform political decision-making. Further, in terms of the perception and conceptualisation of risk, risk perception in the health sector is evaluated by McInnes (2005), whilst Dessai *et al*. (2004) make a strong case for a closer investigation into the various forms of risk perception and construction.

As indicated though, the intention of the research report is to acknowledge these fields of research (more engagement on them is found in Chapter 3). By using a real-world case study the validity of the risk society construct is tested. Similar examples of such studies are found in different corners of the world: Murgida and Gonzáles (2005) apply risk society principles to risk management in Argentina, Bulkeley (2001) to climate change politics in Australia, and Horlick-Jones (1995) specifically focuses on risk creation, perception and management in large urban environments. Other studies also examine Korea (Han, 1998) and China (Wishnick, 2005) as risk societies.

The work in Buenos Aires in Argentina, for example, used a risk society perspective to investigate human security issues related to climate change including flooding of coastal areas. It was deemed an appropriate framework due to the interdisciplinary nature of modern climate change and the focus that risk

society places on the social construction of risk. The researchers conducted workshops in order to understand how various social groupings react to perceived risks, and found that it is exceedingly difficult to resolve uncertainties around response actions, with particular emphasis on the fine balance between increased vulnerability and mitigation actions. In the face of rapid and catastrophic change, observable trends are no longer reliable indicators, and "*...social risk knowledge and communication...*" starts to determine risk responses (Murgida and Gonzáles, 2005). Social construction of risk is also found to be a crucial determinant of risk perception and the move towards actual response actions, which is in turn closely related to the availability and communication of truthful information (Murgida and Gonzáles, 2005).

Horlick-Jones (1995) describes risk in global megacities as the result of the interplay between physical hazards and perceived danger. He also highlights the element of uncertainty – that modern cities exacerbate risks even as they strive to reduce the risks. This is similar to the notion that modernisation can be both the reason for, and the solution to modern risks. A risk-based perspective allowed for an assessment of how technological progress and dense urban networks contribute to the 'manufacturing' of hazards, and illustrated how responses to the risks are fraught with the intricacies of risk politics, popular opinion and global influences. Responses become predisposed towards fragmented individualised management strategies whilst institutional risk management erodes. Actual adjustment to perceived risks in megacities is therefore a highly subjective process, which requires more awareness of the influences affecting risk response behaviour.

An application of the theory by Bulkeley (2001) focussed on the political dimension of modern risk, and in particular how responsibility and obligation is created and contested in Australian climate change politics. The case study used semi-structured interviews and the analysis of policy material to compare actual political definition of responsibilities to Beck's theoretical construct. The analysis uses a graphical framework of the risk society concept to address a common concern that the risk society theory can be elusive when it comes to real-world application (Bulkeley, 2001).

Bulkeley's research found that although the concepts inherent to risk society did not necessarily lead to substantial change in the ultimate climate change policy directions, the risk society thesis did offer some explanation of the present climate change debate. A risk perspective, for example, gives insight into the relationship between the inherently variable spheres of risk politics and risk perception, and on how this relationship determines or is determined by positions of social dominance. It is, however, not a completely new explanation of social institutions such as subpolitics, since the institutions have been present for some time and have not been affected by the growing perception of the new global risks posed by climate change. What was evident though is that new interrelationships between formal and informal politics are emerging. This is indicated by the finding that the formal legitimisation of the causes of climate change (e.g. energy use) has to engage the institutions and agents responsible for the exacerbation of the risks (e.g. industry and community) (Bulkeley, 2001).

The conceptual framework of the risk society theory proves to be an invaluable reference in this type of research since it allows the researcher to begin to locate actions and actors within a broader framework of determinants. It also prevents an analysis from imagining a correlation between evidence and explanation that disregards the wider context possible alternative social scenarios. An example of this is in Bulkeley's finding that subpolitics might not be an absolute indicator of the applicability of the risk society idea since there are other social contextualisations that would also provide scope for subpolitical presence (Bulkeley, 2001).

Risk society can be viewed as the flipside of spectacular technological and industrial advancement, as is shown by the case studies in China (Wishnick, 2005) and Korea (Han, 1998). The Chinese emergence as an economic power has also brought about ecological impacts that find expression in neighbouring states, and indeed on a global scale. The modernisation, therefore, leads to precisely the supernational risks that Beck envisaged, and the need for innovative supernational coping strategies (Wishnick, 2005). The international coping strategies have to adjust to non-military challenges, as opposed to the fear of a Chinese military threat that dominated the Cold War era. In the mean time, and as Beck predicted, the Chinese regulatory structures fail to adequately cope with the modern risk context.

In much the same way, risk is seen as a consequence, and not a failing, of the accelerated modernisation process in Korea (Han, 1998). The Korean context of rapid economic development, political liberalisation and an East Asian religious and cultural morality are considered as forces that help shape the creation and definition of risk. As science and social awareness progress, the definition of risks changes, resulting in a need for new social patterns of risk response and coping strategies, although in the study by Han (1998), emphasis is placed on moral cooperation.

It is therefore worthwhile to widen the evaluation of the application of the thesis in the climate change arena to see how generally the theory can be applied, how important the elements of uncertainty, perception and globalisation are, and to examine whether there are other aspects of risk societies that are material in determining climate change response strategies. This responds to the call by Mythen (2007) for research into the problems and issues raised by the theory, in order to determine which concepts might be fruitfully scrutinised. It is also unusual to attempt to apply the concept to a Third World scenario, given that it has its origins in a post-welfare state Europe of the 1980s (Beck, 1999).

Overview of the Research

Since the basic intention of this work is to investigate the practical application of a theoretical concept, it is inevitable that the research first had to provide a clear conceptualisation of the theory before progressing to a practical application and case study. The research was therefore conducted in three phases – conceptualisation, data collection and data analysis.

Firstly, there was a need to probe into what the concepts of risk society and reflexivity mean for the climate change debate. A literature review provided this context, and highlighted aspects that are relevant to climate change and our modern response to its risks. Writings by Ulrich Beck and Anthony Giddens, as well as the discourse that evolved around their work were used extensively. Various aspects of risk societies were lifted from these texts to explain the process of reaching contested scientific perspectives on climate change. This conceptualisation is presented in Chapter 2, and is used in Chapter 3 to put forward a theoretical framework for climate change responses.

Ultimately, the framework is applied in a case study, by analysing and evaluating the South African National Climate Change Response Strategy in Chapter 4 and Chapter 5. A questionnaire was used by the author as a detailed analysis of the NCCRS document, and thereafter distributed to a small control group in order to confirm or refute the author's assessment of the strategy and to identify further intricacies of the concept. The control group was representative of civil society, academia and government sectors and all closely connected to, or involved in, climate change science or policy in the country. The questionnaire is based on the information gathered in the conceptualisation phase, and is specifically aimed at trying to find risk society indicators in the subject document. The detailed analysis of the NCCRS document is provided as Appendix 2.

An internal ethics process was followed in order to ensure that the participation of respondents was transparent and fair. Respondents were selected through a process of referrals and telephonically invited to participate in the research, and a short background document was provided to willing participants as a brief introduction to the risk society concept and the aim of the research. Only respondents who agreed to participate at this point were then involved in the research project. As part of the ethics process of the School of Geography, Archaeology and Environmental Studies, a consent form was also provided that introduced the author and emphasised that participation was voluntary, not binding on any respondent, and will not result in references to specific respondents in the final report.

Chapter 5 of this report compares and analyses the data in order to answer, or at least elucidate, the application of the risk society concept to a developing nation's climate change response strategy. Finally, in Chapter 6 these findings are related to the core research question of whether the characteristics of risk societies play a determining role in the comprehension of, and responses to climate change threats.

CHAPTER 2 CONTEXT: MODERNISATION, CLIMATE CHANGE RESPONSES AND RISK SOCIETY

Although the theory of Risk Societies is more than two decades old, it is not widely known outside of academic circles. Nevertheless, most people, whether they are fully aware of it or not, are living in what can be classified as a global risk society, under the constant threat of modern global risks. One of these risks, climate change, has recently become central to many international deliberations on the environment, politics and economic development, and a debate is raging around the required responses to the risk.

It is the intention of this research to investigate the nature of some of these debates using various lenses provided by the risk society thesis, and thereby providing some introduction to the concepts of modernisation, climate change responses and reflexivity. Firstly, a contextualisation of the risk society debate is provided by a brief look at modernisation, globalisation and the rise of global risks such as climate change. Secondly, the relevance of the risk society idea to the climate change field is touched upon, with particular reference to the vulnerability and adaptation debates associated with climate change.

The primary purpose of this descriptive chapter is, however, to ensure that the application of the risk society theory is as unambiguous as possible, given that some of its core concepts (such as reflexivity) have either been contested, or differentially applied by different authors. This is achieved through a brief overview of the main themes that are used in the conceptualisation of the theory, but also some consideration of the major lines of criticism that have been raised against the concept. The core of the chapter is, however, devoted to a summary of the risk society construct, as understood by the author, and based on a synthesis of work by Beck (1992, 1994, 1999 etc.), Giddens (1994), Lash (1994, 2000), Scott (2000) and others.

Globalisation of the Environmental Debate

During the past four decades the environmental debate progressed through three general phases. In the 1970s, a growing awareness of environmental impacts was responsible for society starting to question the process of unbridled development and industrial advancement (Hajer, 1995; Blowers, 1997). Along

with the growth in environmental concerns came a demand for appropriate solutions, and consequently environmental thinking became an integral part of the modernisation process in the 1980s (Howes, 2005). Finally, as environmentalism gained mainstream status in the 1990s, society gave birth to modern environmental politics with a real influence on economic and social policy and an ability to interrogate the finer details of the modernisation and environmental spheres (Hajer, 1995; Blühdorn, 2000) (See Table 2-1 below).

Table 2-1 Progression of the environmental debate

1970	1980	1990 onwards
Environmental Awareness	Environmental Solutions	Environmental Design
Ecology	Ecological modernisation	Ecological politics

During the same period, the world experienced widespread and rapid globalisation. Most facets of society achieved some level of globalisation, be it in the disaggregation of production processes or merely in communication networks. The combination of globalisation and the growth in environmental awareness and environmentally influenced actions is responsible for an environmental debate that is becoming increasingly global and complex. It is also becoming more focussed on global rather than local issues, but at the same time makes local issues part of the global agenda (Giddens, 1990; Blowers, 1997). Beck (2002, 6) refers to a "*community of common destiny*" which describes the new global citizenry, in which all people will be subject to the same global environmental problems, irrespective of their location. Local issues, however, colour the global debate – for example regionally uneven resource use (Beck, 2002), unequal spread of base raw materials and fuel sources (Mercer et al., 2006) and the issue of environmental refugees (Paterson, 2002).

As will be shown here, the South African National Climate Change Response Strategy (NCCRS) came about partially because there was a perceived need to address the local impacts and opportunities related to globally universal risks emanating from the modernisation process. The globalised nature of the threat is

mentioned in the very first lines of both the summary and the main document text, but throughout the strategy, the threats are contextualised by local issues such as the drive for sustainable development, poverty alleviation and provision of housing (South Africa, 2004).

Spaargaren *et al.* (2000) argues that a growing reliance on globalised systems of production and interrelationships between international economic entities have made environmental issues that affect other parts of the globe part of our local agenda. This reciprocal relationship results in an infinitely interrelated world and a vast amount of information being available to inform opinions and decision-making.

The complexity and diversity of opinions is a good thing on the one hand, as it furthers the integration of different opinions and ideas, but on the other hand it could potentially lead to a state of uncertainty in which we lose control over what is considered common truths (or maybe it already has). Integration of information and ideas will, however, see the globalised environmental debate directing the decades of experience in ecological modernisation and politics towards increasing levels of international debate and problem-solving. This would be a natural reaction to the increasingly global nature of the environmental issues of our time such as poverty related resource degradation, reliance on carbon-based fuels, depletion of international marine resources and, of course, climate change (Munnichs, 2004).

Climate change is probably the 'most global' of the global issues. It has relevance for everyone on the planet, operates on a planetary scale, and is dependent on the dynamic relations between the human population, water, air and landmasses. In addition, it promises effects that will extend well into the future beyond the lives of the currently living generations (IPCC, 2007; 2008). Consequently, global acknowledgement creates a fertile field for the cultivation and cross-pollination of ideas and opinions on climate change, as well as the scope for global co-ordination in the generating of responses. This is shown by the current international climate change debate which is given structure by the United Nations Framework Convention on Climate Change (UNFCCC), the subsequent Kyoto Protocol and the scientific co-ordination of the Intergovernmental Panel on Climate Change. Together, these three arenas manage to divide the countries of

the world into two 'camps' – those who support the Kyoto Protocol and its strategies for global emission mitigation, and those who choose to set their own responses and emission reduction schedules. Preference for one or the other group is largely determined by local economic considerations, but the economic ties that are affected are of global scale, as are the negotiations and politics that inform the framework actions of the conventions (UNFCCC, 2003).

Climate Change Response Strategies

With the debate about climate change having been around for some time, a myriad of parties and opinions have been drawn into the deliberations. What makes the topic so universal is the understanding that climate change will, to varying extents, affect everyone and everything that is reliant upon natural resources and vulnerable to natural hazards (IPCC, 2007 a and b; 2008). Climate change therefore constitutes a form of threat to anyone or everyone, whether a person believes that climate change represents a global catastrophe or simply another popular opinion panic. What will be different for each individual is the perceived significance of the threat, the real extent to which any party will be affected, as well as the opportunity costs of using climate change as an economic or political vehicle. To individuals, climate change might imply rising fuel costs, whilst larger institutions could find that carbon trading mechanisms are affecting their market penetration strategies. Governments on the other hand could consider the opportunities created by the Clean Development Mechanisms (CDM) of the Kyoto Protocol as drivers for increased foreign investment and trade. It is therefore inevitable that strategies be developed to deal with whatever perceived or real threat climate change might pose, and to understand and optimise the opportunities created by a globally integrated issue.

The global nature of risks in modern society is discussed in Beck's return to his original work on risk society, namely *World Risk Society* (Beck, 1999). He explains that the risks produced by society do not remain risks solely for the producing entity, but actually for the entire world. Class distinctions are removed due to the overlap between class and risk (i.e. risks are posed to everyone, irrespective of social status). Hence his catchphrase *"poverty is hierarchical, smog is democratic"* (Beck, 1992, 36). Risks may be created anywhere in the world as point sources, but the effect could be global (Beck, 1999, 2). Non-risk

producing nations therefore face the same challenge as the risk producers, and hence should also be evaluated within the risk society framework (Beck, 1999, 3).

What should not be forgotten though, is that the modern risk society creates a fertile field for First vs. Third World inequality due to their differing vulnerability and resilience ratings. Poverty and underdevelopment are conditions under which risk-producing activities flourish, creating yet more risks or adding to the drivers of existing risks. The consideration of risk society principles also applying to the Third World is potentially important:

> *"To situate the non-Western world firmly within the ambit of a second modernity, rather than of tradition, allows a* ***pluralisation of modernity****, for it opens up space for the conceptualisation of divergent trajectories of modernities in different parts of the world" (Beck, 1999, 3).*

Beck suggests, however, that responses need not be intentional (Beck, 1992). The institutions of industrial society remain with the potential to react to the new state of risk, without necessarily acknowledging or engaging the exact characteristics of the new modern risks. No 'risk perception' is therefore involved, since the responses are automatic (in the sense that the reaction follows existing patterns of response). Using climate change as context, an example would be the adaptation to rising sea levels, due to increased storm surges. The reaction is unaware of the nature and wider climate change-related origin of the risks, but because of the costs of seawall protection, fewer people would settle in the risk zone. The consequence is a change to the ultimate risk exposure, but not the nature of the risk itself. Should climate change debates, however, permeate political and social debates, it could change the manner of response and question the very drivers of climate change that are ultimately responsible for the climatic changes. The response would then be very much aware of the problem and attempt to address it by focussing on the drivers of climate change as opposed to mere adaption to it.

Climate change responses by different sectors of government, business and civil society will consequently cover a wide spectrum, but may vary on any number of different levels - for example, from precautionary approaches aiming to avert a global catastrophe to adaptation measures that may save on individual insurance

premiums. The particular response is determined by whether or not the risk is 'perceived' and therefore engaged with, and thereafter by the perceptions held by the person or institution that needs to react, since it is the perceived severity or immediacy of the expected impacts of climate change that will influence the decision to act as well as the ultimate actions. Perceptions are therefore central to the conception, constitution, implementation and ultimate effect of particular responses (Yohe and Dowlatabadi, 1999, Leiserowitz, 2006).

Having given some background to broader global climate change response strategies attention now turns to examine the creation, compilation and broad architecture of climate change strategies in South Africa.

The South African climate change strategy was published in 2004, based on the country's first submissions to the United Nations Framework Convention on Climate Change, and following ratification of the UNFCCC (1997) and the related Kyoto Protocol (2002) (South Africa, 2004).

The strategy, however, has its roots in the Interdepartmental Co-ordinating Committee for Global Environmental Change (ICC) which was established in 1991 by DEAT in preparation for the 1992 World Summit (Shackleton et.al., 1996). The ICC advised government on matters pertaining to climate change, and produced various specialist advisory documents that culminated in a draft climate change policy in 1993. Following the coming to power of the 1994 democratically elected government, however, the ICC was replaced with a more representative structure in the form of the National Committee on Climate Change (NCCC). This committee still operates under the chairpersonship of DEAT and remain the most central debating arena for the climate change field in South Africa.

The replacing of the ICC with the NCCC, and the sudden change in governmental policies and priorities, meant that the finalisation and official publication of the strategy only took place in 2004 following several interim publications and historic world events in the climate change arena. Amongst other reasons, the delay was related to final parliamentary adoption processes that took more than a year to conclude (Turner, 2008).

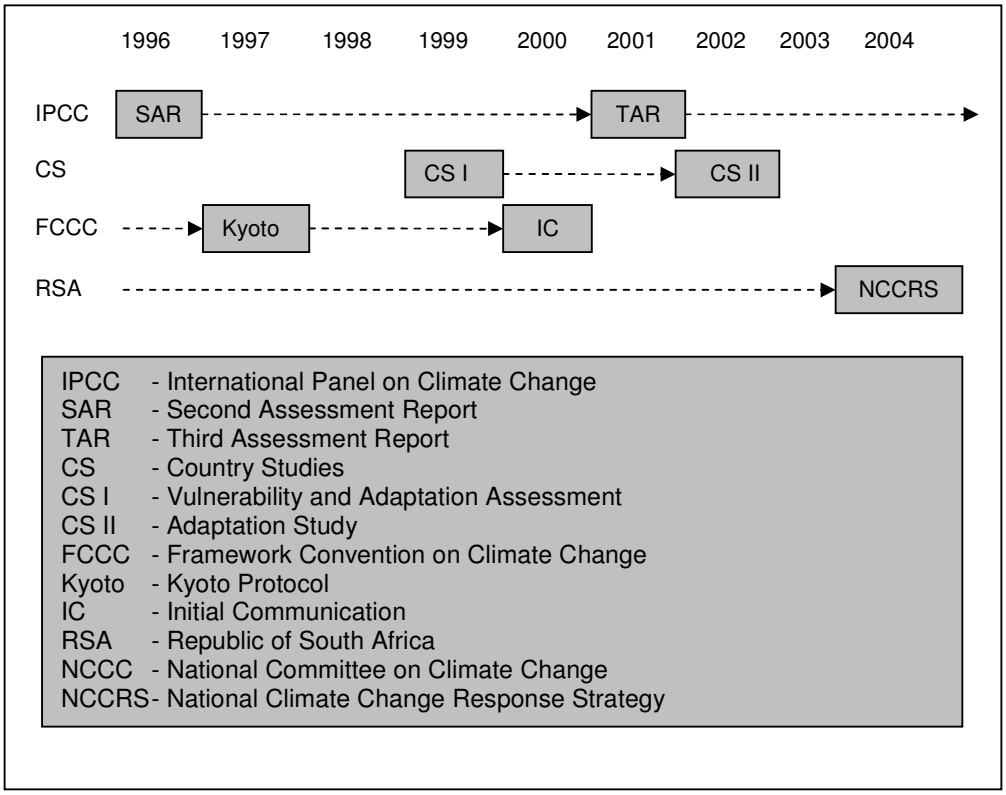


Figure 1: The South African climate change response in an international timeline context

The compilation of the relevant Country Studies reports during the period between the ICC draft strategy and the final NCCC version, and especially the *"South African County Study on Climate Change: Synthesis Report for the Vulnerability and Adaptation Assessment Section"* (Kiker, 1999), laid the foundation for the development of the final strategy (South Africa, 2000). It was followed by the Initial Communication (IC) provided to the UNFCCC (South Africa, 2000) as well as the more detailed Adaptation study under the auspices of the Country Studies project (South Africa, 2002). All of this occurred against the backdrop of the scientific effort on the part of the IPCC which published the Second Assessment Report in 1996 and the third instalment in 2001 (IPCC, 1996 and 2001).

South Africa does not qualify as an Annex I country in terms of the Kyoto Protocol, and therefore is not under obligation to reduce its own contribution to climate change inducing actions and emissions. However, climatic change could

have a dramatic effect on the South African industrial and resources sectors as a result of the relatively high vulnerability of the subcontinent (South Africa, 2003). The strategy was therefore compiled in order to steer economic and social development in the country in a manner that will be able to adapt to the projected climate change risks (South Africa, 2004). This objective is not far from the approaches taken by Australia and the United States (Bulkeley, 2001). As a developing country, however, South Africa should be an enlightening case study of the practical application of the risk society concept since, as Bulkeley (2001, 431) finds:

> *"The challenges of governing climate change have been apparent as nation-states struggle to come to international agreement and take domestic action. These struggles have been particularly evident in contexts where environmental and economic interests are seen to be in conflict…"*

Mitigation and Adaptation

Just as the general environmental debate progressed from simple awareness and solutions based on adaptation to truly integrated environmental management and design, so too do distinctions appear between different climate change responses. The responses can be broadly classified in two ways – either as mitigation or adaptation (IPCC, 2008). Mitigation refers to strategies that advocate immediate action to limit the extent to which climate is likely to change through actions such as emissions reduction and alternative energy solutions. It is aimed at the primary causes of risk, with efforts invested in directly reducing the scale of climatic change. In contrast, adaptation strategies are solutions that give society a greater capacity to absorb the effects of climate change impacts. Instead of utilising resources in slowing down climate change, resources are applied to find strategies through which communities can cope with, or avoid adverse climatic conditions. Adaptation can therefore broadly be likened to the environmental awareness phase, where end-of-pipe solutions were found, whilst mitigation represents more involvement in the design of systems that rely on natural resources (Tompkins and Adger, 2005).

In all likelihood, different policies will achieve a greater or lesser extent of each of the two directions, resulting in response strategies as illustrated in 2:

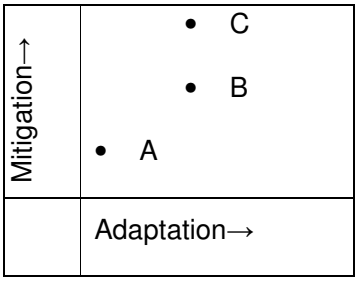


Figure 2: Mitigation and adaptation strategies

The choice between adaptation and mitigation is determined by the perception of both risks and opportunities. In terms of the perception of risks, the elected reaction is determined by the immediacy and severity of the identified threat. The logic is simple – if the impact threatens any important life, business, political or other interest, then action will follow to lessen the impact. The timeframe over which climate change impacts will play out will have an influence though. The shortest period for climate change impacts is a scale of decades (United States, 2002), and consequently mitigation might not be selected as the best strategy since the impacts will not affect the individuals who are currently comparing the threat of future impacts to the costs of immediate large-scale economic transformation (Tomkins and Adger, 2005). In the NCCRS (South Africa, 2004, 6) this is suggested by the following statement:

> *"Some mitigation actions may yield extensive benefits in areas outside of climate change such as health, employment opportunities and reducing negative environmental impacts. However, the costs incurred by such actions may be excessive and render the actions unattractive."*

This decision is, however, further complicated by the opportunity costs offered by climate change. The South African approach, for example, specifically states:

> *"While it is extremely important to understand the reality and constraints of the South African economy, no door must be closed to any action based on sound economic principles, which can bring tangible benefits to the country and its people" (South Africa, 2004, 34).*

This allows for immediate responses in order to speed up technological change that may improve production processes in a way that can improve profits, or gain valuable stakeholder support if there is pressure for appropriate change.

A strategy that tends towards adaptation, however, seems to suggest a more conservative approach that involves more opportunism. Adaptation focuses attention on strategies to cope with the effects of climate change over shorter periods. Such an approach has proven popular with developing nations seeking assistance in order to pursue a high rate of industrialisation and modernisation, as well as well-modernised countries such as the United States who rely on their industrial strength to keep their economy healthy (Bulkeley, 2001). Adaptation is therefore preferred in cases where stakeholders need to be assured that they will not face immediate penalties, and that contributions to a climate change response will be deferred to long-term strategies.

The decision-making and trade-offs regarding adaptation and mitigation on the whole are borne out by the contextualisation provided by the NCCRS and its actual contents (South Africa, 2004). The strategy indicates that its main driver is the need for the South African economy to adapt to the likely physical and economic impacts of climate change, but climate change mitigation actions are possible as a long-term macro-economical shift in the economic base sectors. Both adaptation and mitigation in the short term would, however, only be considered if they are shown to be economically beneficial and compliant with the various economic development strategies of the country. The end result is a policy that applies climate change response measures conservatively, in order to accommodate the impacts, whilst maintaining the capacity to adopt more progressive measures as the economically viable opportunities present themselves through funding and international production or technology transfers.

The stronger focus on adaptation, as opposed to mitigation, is a theme that is already clear in the Country Studies report submitted by South Africa to the UNFCCC (South Africa, 2003). In the report, it is stated that despite mitigation options existing, the national focus will remain on priorities such as poverty alleviation, basic facilities and health.

Both approaches to climate change responses use scientific uncertainty as motivation for action or inaction. Promoters of mitigation will argue that the

uncertainty implies that we do not know whether there are certain climatic thresholds that could spell disaster, and that we do not know how far we are from breaching the thresholds. A precautionary approach is therefore employed to avoid unknown impacts. In contrast, a conservative approach in respect of unnecessary resource allocation is advocated by the supporters of adaptation strategies. It is argued that the uncertainty means that the threat cannot be adequately quantified, and that a hasty allocation of resources is foolish. Rather, it is claimed, these resources should be directed towards coping with the likely inevitable impacts until more certainty is achieved.

Risk Society and Reflexivity

How then, is society to understand and make sense of the climate change problem and the responses thereto? What yardstick can be used to judge the appropriateness of the responses? Or even, how do we go about conceiving such a measure?

In this research report, the possibility of using the concept of risk society as an analytical tool to gain a better understanding of the construction, perception and responses to climate risk is given consideration. Any insight into the nature of modern risks experienced by developing societies could translate into more appropriate strategies through which the vulnerability of marginalised members of these societies can be reduced. As is discussed later on in this chapter, criticism raised against the theory makes it necessary that the research be specific in the approach it takes with regards to disputed concepts inherent to the risk society approach, and in particular, the difference between 'reflexivity' and 'reflection'.

It is, therefore, necessary to briefly consider the core elements, concepts and relevance of the risk society theory, before the attempt is made to apply the theory in practice.

Risk Society

Beck (1992, 27) advanced the idea that our current state of 'late' modernity has moved away from being structured by industrial era ideology:

> *"If modernisation is understood as a process of innovation which has become autonomous, then it must also be accepted that*

modernity itself ages. The other aspect of this ageing of industrial modernity is the emergence of risk society."

His premise is that the core characteristics and operating principles of society has changed, or are changing in a way that society can no longer be understood or managed by the social theories of the industrial era (Giddens, 1990; Lacy, 2002). The world now finds itself in a state where industrial and post-industrial hazards and threats are becoming increasingly important in decision-making, thereby usurping a fair amount of the power of wealth and social class that are inherent to industrialisation and modernisation:

"The concepts of 'industrial' or 'class society', in the broadest sense of Marx or Weber, revolved around the issue of how socially produced wealth could be distributed in a socially unequal and ***also*** *'legitimate' way. This overlaps with the new* ***paradigm of risk society*** *which is based on the solution of a similar and yet different problem. How can the risks and hazards systematically produced as part of modernisation be prevented, minimised, dramatised, or channelled? Where do they finally see the light of day in the shape of 'latent side effects', how can they be limited and distributed away so that they neither hamper the modernisation process nor exceed the limits of that which is 'tolerable' – ecologically, medically, psychologically and socially?" (Beck, 1992, 19) (Emphasis by original author)*

Modern 'risk' society supplements industrialisation ideology with 'risk perception' and 'risk management'. This is a direct consequence of a modernisation process that brought about an array of unintentional and unexpected latent side-effects in the form of global risks. Beck (1996, 13) summarises his reasoning:

"The argument is that, while in classical industrial society the 'logic' of wealth production dominated the 'logic' of risk production, in the risk society this relationship is reversed...The productive forces have lost their innocence in the reflexivity of modernisation processes. The gain in power from techno-economic 'progress' is being increasingly overshadowed by the production of risks. In an early stage, these can be legitimised as 'latent side effects'. As

they become globalized, and subject to public criticism and scientific investigation, they come, so to speak, out of the closet and achieve a central importance in social and political debates."

It is crucial for a comprehension of the transition to a risk society state to understand that the concept of a 'risk society' should not be seen as a particular 'end state'. The emergence of risk societies should be envisaged as a diversification of the traditional evolutionary development model that is characteristic of industrial modernisation (Beck and Willms, 2004). Even as 'normal' modernisation takes place, risks are produced that cannot be adequately responded to by the systems and practices of the existing modernisation process. These risks therefore require novel responses that transcend national boundaries, demand innovative solutions and are very likely to be driven by or based in social spheres that are outside of the official authoritative structures.

A 'risk society' is likely to have three forms of modernisation present simultaneously (Beck, 1999):

- A first modernity that relies on traditional modernisation to deal with modern risks (residual risk society)
- A second, or 'late' modernity that faces risks that outgrew the ability of the existing institutions of industrial society to control them
- A third form where risk response becomes the object of public, political and academic debate

In the first 'phase', society employs an automatic response in the form of existing problem solving techniques (technological and industrial modernisation) in order to react to risks. The only knowledge or perception of risks exists within descriptions obtained from scientific forums, yet perceptions begin to shape responses. The size or extent and nature of the risks will change over time though, since the responses do not directly address the risks, but rather add to the main driver of the risks by relying on a sustained modernisation drive to deal with the risks. Progressively, existing social institutions lose control over the risks due to the imperceptible nature and global scale of the new modern class of risk and the inadequate scope of 'normal' modernisation responses. At this point modernisation will, according to the risk society theory, give rise to risk responses that necessarily have to transcend the boundaries imposed by national borders

and formal politics. The responses to risk, however, remain automatic in the sense that existing modernisation thinking is used to define the risks and to find solutions to the problems. Importantly though, these responses will now start to change the nature of the modernisation risks in a reflexive manner. This implies that the responses self-critically change the risks in ways that lead to fundamental changes to the risks, leading to new forms of risks and new social institutions. Risk societies can therefore be described as having reached a state of reflexive modernisation.

Although, in the reflexive state, the dominance of the authoritative structures in modern society is being eroded, the risk responses remain to a large extent outside of public debate. Ultimately, however, once the new risks become known to a wider audience, the decline of the 'modern' governance structures will result in the creation or emergence of new social structures and institutions, and responses that are based on social definitions of risk. Such risk perceptions in the public and academic domains will result in conscious decision-making and engagement on the risks prior to responses, also termed 'reflection' by Beck. Reflection is therefore a different response to risk than reflexivity, in the sense that it involves an awareness of the risks and their nature, as opposed to 'unawareness' that characterises reflexivity (Beck, 1999).

It must be stressed though that this distinction between the phases is described as a heuristic device that makes the description, understanding and analysis of the transition to risk society possible (Beck and Willms, 2004, 32):

> *"Its purpose is methodological and pragmatic. It enables us to pose the question of new categories of thought and a new frame of reference in the clearest possible terms. It allows us to conceive of frameworks in emergence, and of frameworks in overlap, and of both at the same time, which in the end is what we're actually dealing with. It should in no way be misunderstood as an evolutionary periodization."*

The distinction should therefore be used with caution when applied to real-world situations, as all three forms of response could be present at the same time, and within the same social context.

According to Beck (1996), the inability to insure modern risks is the best proof of the existence of a risk society. Although the individual risks of climate change prevailing at any one time can be insured in the short term, evaluation and the correct pricing for the long-term risks of climate change is extremely difficult. This is borne out by a recent publication from the insurance company *Lloyds* that raises the concern that continued climatic change or improper regulatory action could change their view that the associated risks are insurable (Lloyds, 2006). Risk society has therefore essentially taken over from the welfare state context as the defining characteristic of the most developed countries during the past few decades (Beck, 1999). Societies are now starting to use risk perception to inform decisions and actions on all levels, since the existing social security mechanisms are not equipped to deal with the new scale of risk. As Beck (1996, 27) states:

> *"This concept describes a phase of development of modern society in which the social, political, ecological and individual risks created by the momentum of innovation increasingly elude the control and protective institutions of industrial society."*

Climate change, as example, cannot be insured due to the scale and uncertain nature of the risk. Risk society therefore leaves individual actors or parties in society with a personal or individual need for reaction to the risk if they are to reduce their vulnerability to, or the impacts of climate change.

Reflexivity

As indicated, the need to respond to the consequences of modernity has advanced society from simple industrial modernisation to a state of reflexivity. Generally speaking, reflexivity in modernisation refers to a state of affairs in which problems related to progress and development are identified, but at the same time the solutions to the problems are found within the same process of development. A reflexive society therefore reacts to the risks produced by its progressive modernisation, but is forced to rely on further modernisation to correct the problems through an iterative self-critical process. Society no longer modernises towards a certain goal, but instead continuously reacts to new information coming in about social practices to redefine itself and adjust the practices (Matten, 2004). Reflexivity is therefore internal to society and society consequently becomes an object of modernisation at the same time as being a

driving force for it. This reflexive process can, and should, change the principles of development and modernisation, thereby leading to a completely new state of existence. As a consequence, the modern social context challenges and changes the foundations of the social, economic and political spheres.

South Africa's climate change strategy, as is shown here and later in this report, is an example of reflexive modernisation. Despite the fact that it acknowledges modernisation as the root cause of modern climate change risks, the climate change response strategy, in the main, also views modernisation as the primary 'solution' to the local vulnerabilities to climate change (South Africa, 2004). Therefore, modernisation becomes self-critical and reflexive. As a result, economically viable and beneficial development and modernisation is recommended through actions such as technological innovation and transfer, adaptation of production techniques and social systems and restructuring of the energy sector.

Reflexivity actually features as a universal theme of modernity. For instance, science creates and conceptualises modern risks, but is then also employed to find solutions to the risks such as in the case of the IPCC work. In the same manner, it is found that the success of the democratic political system causes it to lose its centralised locus of control, but the complex decentralised political system then has to deal with the resulting uncertainty of control and regulation (Webster, 1999). Generally, society turns reflexive, since its increasing flexibility allows it to create new problems, but also an infinite ability to adapt to the new uncertain and globalised nature of risks.

A particular intricacy of the risk society concept, however, deals with the difference between, and transition from, 'unawareness' of modern risks to self-criticism and knowledge. In contrast to another promoter of the concept of reflexive modernisation, Anthony Giddens, Ulrich Beck repeatedly explains that reflexivity is about more than just 'reflection' (Beck, 1999, 73):

> *"If we call the autonomous, unintentional and unseen, **reflex**-like transition from industrial to risk society **reflexivity** – in distinction and opposition to **reflection** – then 'reflexive modernisation' means self-confrontation with the consequences of risk society which cannot (adequately) be addressed and overcome in the*

> *system of industrial society... At a second stage this constellation can, in turn, be made the object of (public, political and academic) reflection, but this must not cover up the unreflected, reflex-like 'mechanism' of the transition." (Emphasis by original author)*

According to Beck, 'reflection' is present as soon as a decision is faced on whether or not, and how, a particular risk should be responded to. This decision needs to be informed somehow, and consequently scientific description, social awareness and political uptake become inherently part of the risk response process. He adds:

> *"With Tony Giddens, it's actually **reflective** modernisation that's his main concern, in the sense of self-reflection on the foundations and consequences of modernity. He sees this as anchored in systems of experts who are continually analysing and then overthrowing their old conceptual foundations and thereby making new structures possible...[I]f we make this the central identifying feature, it becomes almost impossible to draw a distinction between reflexive modernity and normal modernity" (Beck and Willms, 2004, 32)(Emphasis by original author).*

What is not clear in Beck's work though is exactly where the transition between the two states lies, and what it looks like. Completely 'unintended and unseen' social change without some degree of self-awareness is unlikely. It is possible that the transition can be fluid, allowing the two concepts to overlap within the same dynamic process of change. The initial, reflexive response by society to self-conceived modern risks is, however, envisaged as an unintended reaction to stimuli that changes the very foundations of the reaction triggers as opposed to conscious deliberations.

As indicated by Beck (1999), all aspects of society, including industry and science, modernise to a point where they become self-critical and therefore 'reflecting'. Science, for example, becomes self-critical in the sense that it can call into question its own foundations. This means that completely opposing scientific opinions or reasonings may exist concurrently, and yet remain equally valid. A good example of this is the ability of the social sciences to critically examine the relationship between policy and the natural sciences (Blowers, 1997). Also,

climate change is such a popular debate precisely because no one seems to agree on the nature and scope of its threat even considering the vast amount of global resources that is being applied to climate change research.

According to Beck's second form of late modernity, therefore, modernised society becomes reflecting, scrutinising its social systems and character, and starts to criticise aspects of the social environment that form part of the modernised reality. This is more a descriptive process than an active effort at change, where all efforts are aimed at trying to gain a better understanding of the identified problems. In due course, however, the scientific knowledge will intentionally, and with a wide ranging awareness of the issue in various levels of society start to influence and change the social drivers of unwanted effects. The end result is infinite possibilities for adaptation and change, and probably a complete loss of the traditional linear progression of 'social development' or modernisation. It should, therefore, be considered that reflexivity can form part and parcel of a reflective state, and *vice versa*. They are specifically not considered as autonomous components of risk societies. Such an analysis would fail to identify and frame the consequences and opportunities of the new modernity adequately but instead revert to an analytic form relevant to early modernisation.

In the reflective state, the individual actors (individuals or institutions) achieve a freedom to choose from infinitely flexible reaction or adaptation strategies, as opposed to the previous traditional or modernised states where shared interests based on localised social institutions and nationality were the defining aspects. Beck (1999, 9) describes this second modernity as follows:

> *"…a 'new period of human freedom', a post-disciplinary age, where the foundations of national identity, family, gender, sexuality and intimacy are being renegotiated and reconstructed, with human beings beginning to develop a sense of global responsibility, sensitive to the demands of an ethical globalization."*

He describes an idealised new modernity in which people strive for a collective *global* benefit. In practice, however, we can assume that individual values and interests would feature alongside the global interest. If, as is implied by the risk society concept, we are responding to risks rather than ideology then social action must be based on risk to the self. If the risk is, however, global, then the

universal global response would create a new global identity, thereby matching what Beck was proposing.

The postmodern individualised freedom is a consequence of the advent of globalised communication and ever-freer flow of information, capital, goods, services, and people (the information society) (Van Gennip, 2005), and a concomitant access to a myriad of opinions and views that allow individuals to critically assess their context. Or, as Beck (2002, 6) puts it:

> *"…it is the reflexivity of the world risk society that breaks the silence of words and allows globality to become painfully aware of itself in its own context and builds new approaches to conflicts and alliances."*

Critical individuals can reflect on the knowledge about their relationship with institutions and question the implication thereof for their own self-realisation. Hence, the 'reflecting' individual becomes part of a 'reflexive' society, where reflexivity refers to a self-confrontational active adaptation to, or of, rules and resources. As a result individuals or social institutions and structures make sense of the environment in different ways, and respond differently to the disparate aspects that might be perceived as problems. Different perspectives will therefore see different problems, but also frame different solutions to the same problems, depending on how sense is made of the uncertainties that surround environmental issues.

In a risk society there are three important uncertainties when *reflecting* on climate change risks. Firstly, the risks themselves are uncertain (IPCC, 2008). Secondly, actors are free to determine their own perception of the nature and scale of the threat (Leiserowitz, 2006), and thirdly, actors may also decide on the appropriate response to the risk perception (Tompkins and Adger, 2005). Consequently, the evaluation of risks needs to consider whether climate change will have direct or indirect impacts, and has to inform a process that subjectively set thresholds at which a reaction to the perceived risks becomes individualised. Blowers (1997) describes the thresholds of acceptable risk in the form of tolerance to risk as used by the nuclear industry. According to this framework, risk will fall in three zones, namely a broadly acceptable region, one where risks need careful consideration and a region where risk is unacceptable. The variable limit of

acceptable (tolerable) risk would fall in the middle category, and chances are that paradigms will only change if the risk is very obviously greater than short- to medium-term personal, economic or political interests. An important note here is that human lifetimes are so much shorter than climate change cycles, which means that modern society can afford to be self-centred in response, thereby limiting the response to actions that defer the risk to later generations. This is another example of how the trade in produced goods typical to early modernisation is replaced by a trade in risk in risk societies (Beck, 1992).

The greater the reaction to the risks though, the less real the original risk becomes since the response will reduce the severity or significance of the risks. Consequently, both reflexive and reflecting society finds itself facing a personalised reality in which both perceptions of risks and reactions thereto are ever-changing. This results in a social context where a universal truth free of intellectual determination or set pattern of development of the political ecology cannot exist.

Criticism of Risk Society

Beck's work is not universally accepted and applied though. As Mythen (2007) points out, Becks style of writing and lack of empirical substance opens the work up for criticism. The apparent weaknesses of the thesis, or 'fissures', nevertheless have *"...opened up the exchange of ideas and stimulated the advancement of social knowledge..."* (Mythen, 2007, 803). Three broad areas of criticism of Beck's ideas exist. Firstly, he is criticised on the basis of his theoretical reference frameworks, secondly on the basis of an uncertain real-world application, and lastly, on the nature of the various concepts used as part of the risk society theory.

The first criticism that Beck acknowledges (Beck, 1999; 2000) relates to the philosophical reference framework that gives structure to his theory. In particular, his conjoined use of realist and constructivist interpretation (Mythen, 2007).

Critics argue that he is too realist in his world-view, thereby limiting the understanding that can be gained from more constructivist perspectives on risk perception. Whilst he uses realist cause-and-effect reasoning to blame positivistic science for the rise of modern global technological threats, he neglects the

process where these threats are turned into risks by social perception (Healy, 1997). Beck's response is that he is equally comfortable with the use of either device, as he does not want to be limited to the enlightenment offered by only one of the tools. His use of realism allows the risk society concept to map out the progression and process flow of information flow, risk creation and risk response behaviour in modern society, but he acknowledges the 'practical' reality that perception (i.e. constructivism) adds to the premise (Beck, 1999). Adam and Van Loon (2000) support Beck in this argument, with their view that the distinction is irrelevant, because what matters is the actualization of risk.

Any application of such a dualistic framework therefore needs to be fully aware of the limitations of both perspectives – i.e. the 'unrealistic' world-view of realism, and the 'uncertain' nature of constructivism. Beck (1999) does assert though that the two perspectives ultimately agree in their diagnoses of society in the sense that they both justify the use of the concept of a risk society.

In addition to the aforementioned debate, there are several voices of concern regarding the context in which the risk society theory originated (Scott, 2000, Beck, 1999). During the 1980s, when Beck was working on the first risk society publication, Europe was still living under the threat of violent ideological clashes between East and West – the cold war was still in full swing, and the USSR remained in firm opposition to all the Western nations. At the same time, Germany became environmentally aware in a way that manifested in 'ecological politics' (Beck, 2000). It is therefore easy to read Eurocentric or Germanocentric paranoia into Beck's work (Bulkeley, 2001). Beck is quick to point out though that most of his examples of modern global risks are either located outside of Germany, or have effects that impact on a global scale. In this manner, for example, no amount of Germanocentrism can be blamed for an analysis of mad cow disease (Bovine Spongiform Encephalopathy, or BSE) in the United Kingdom (Beck, 1992; 1999; 2000).

The reality check does mean that the applicability of the risk society theory in non-European, or non-Western locations can be questioned (Blowers, 1997; Bulkeley, 2001; Mythen, 2007). Beck fails to engage to any degree on the so-called developing world, and how nations that follow a delayed process of industrialisation fit into his vision of a late modernisation period. In fact, some

even point to Beck's limited attempts at applying his theory to real-world case studies whether in non-western nations, or not (Benn *et al*, 2008). According to Benn *et al* (2008), patterns of cooperation between companies and *loci* of influence cannot be assumed to be universal. The evaluation of actual cases should therefore be encouraged.

As a consequence, there exist an opportunity for research that can have global relevance. Specifically, there is a need to show how much, if any, of the risk society theory applies in developing nations through actual case studies. Blowers (1997, 858) raises the concern that the risks faced by developing nations make the risks in Western countries seem "*almost luxurious"*. Risk perception in the global South therefore takes a much more complex shape as a result of the multiple personalised 'survival' risks such as war, famine and disease. Investigations into risk perception in a more desperate socio-economic context would offer insights into whether the risk society perspective needs to be adapted to accommodate modernisation trajectories that are similar, yet fundamentally different, from the Westernised contexts that Beck used as his references. This would, as a matter of course, also address critics that find that all the characteristics that Beck uses to define a risk society can be readily identified from any phase of industrialisation (Blowers, 1997; Scott, 2000).

Some of the concepts inherent to the risk society perspective also come under cross-fire. These include the dialectic between reflection and reflexivity (Bulkeley, 2001), particular views regarding the cultural aspects of risk societies (Lash, 2000), subpolitics (Bulkeley, 2001) and manufactured risk (Lacy, 2002).

The distinction between reflexivity and reflection proves to be one of the most hotly debated components of risk society, as it appears that every commentator has his or her particular view of what the two terms denote. Reflexivity, in its purest form, refers to any process that is turned back onto itself in a self-reflective manner. However, as part of the risk society thesis, Beck narrows the definition down to apply only to autonomous, unintended, reflex-like modernisation reactions (Beck, 2004). This is in direct contrast to Giddens (1994) who applies the concept in a way that also covers the considered, conscious decision-making which Beck defines as 'reflection'. A similar distinction is used by Lash (2000)

who refers to 'determinate judgement' as opposed to 'reflexive judgement' as his particular take on risk construction and definition.

The heart of the debate is, however, the failure on Beck's part to show where reflexivity turns into reflection. It is unlikely that responses would exist in real-world situations without some degree of awareness, which means that Beck's insistence that the concept of 'reflexivity' be used simply as an analytical device, and not an actual reflection of society, is rather important (Beck and Willms, 2004). What is required, are case study examples of risk society where it can be shown what the distinctive differences are between the two concepts. In that way, Beck's reflex-response definition will become increasingly tangible and useful as a tool.

In terms of the definition of risk society, Scott Lash argues that the concept of a 'risk culture', which denotes and places emphasis on the constructed nature of risk, should rather be used (Lash, 2000). His premise is that the concept of risk is inherently an imagined and emotional construct, and therefore should not be seen in any realist manner. Beck's (1999, 135) response to this argument is simply:

> *"I do, however, find Lash's discussion valuable in that he has highlighted the radicalization of the cultural framework of risk by cultural theory and cultural studies…So ultimately:* ***it is cultural perception and definition that constitutes risk****. 'Risk' and the '(public) definition of risk' are one and the same".*

With this, he embraces Lash's contribution not as criticism or as challenge to risk society, but as part of the discourse that adds dimension to the theory. He also indicates that a focus on cultural definition of risk fails to acknowledge the institutional dimensions of risk and power that are as important in constructing and defining risk (Beck, 2000).

Bulkeley (2001) identifies a further weakness in Beck's work in her investigations into the presence of so-called 'subpolitics' in the environmental debate in Australia, namely his approach to the manufacturing of risk societies. She finds a *"...fair degree of confusion and ambiguity in Beck's writing over the political consequences of reflexive modernisation and the evolving 'subpolitics' of risk*

society" (Bulkeley, 2001, 434). On the one hand she points out how Beck suggests that subpolitics will take over from formal politics but at the same time also that the existing formal political system will retain power and connections in society. On the other, her research indicates that the presence of subpolitical structures cannot be assumed to be exclusive to late modernisation. A similar view is aired by Lacy (2002) who fails to see how subpolitical bodies relate to capital interests, and by Benn *et al* (2008) who ask for more investigation into the relationship between local individualised risk and globalism in the subpolitical arena.

The concept of subpolitics, therefore, appears to be another aspect of risk society that needs description in real-world scenarios, in order to give further dimension to the concept. The application of the theory to different case studies would allow the academic discourse to define the term better, and in so doing add value to, or better describe risk society as a whole.

The final avenue of criticism relates to Beck's failure to offer an adequate alternative social construct as counter for the uncertain and 'risky' late modernity. Lacy (2002) asks whether Beck goes far enough in his 'risk awareness' since the wide scope of modern risks could imply that a completely new economic and social order is required. A similar question is posed by Levitas (2000) in terms of Beck's vision of a rational and risk aware responsible modernity (Beck, 1998). Beck also professes to bring hope to a society facing uncertainty (Beck, 1998), yet expresses a sceptical position towards science and technology as solutions to ecological problems (Blowers, 1997; Cohen, 1997).

Beck's answer to his critics lies in his more recent use of the concept 'cosmopolitanism' as the description of his envisaged utopia (Beck and Willms, 2004). What he would like to see is a society that does not function on the basis of individualism, but instead a democracy of self-reflecting decision-making. It is Beck who defends himself by indicating:

> *"What I suggest is a new model for understanding our times, in a not unhopeful spirit...To me, technical (or ecological) democracy is the utopia of a responsible modernity, a vision of society in which the consequences of technological development and economic change are debated before key decisions are taken...Many*

theories and theorists do not recognise the opportunities of risk society." (Beck, 1998, 20-21)

In practical terms, a society where politics, science, technology *etc*. are not produced or used without being self-aware as a result of risk awareness that shifted the loci of power away from traditional institutions of power. In this way he does offer some more concrete view of what society should look like, but the image is not yet tested, nor can it be assumed to be universal. As indicated in an earlier point, Beck's ideas have not been tested widely in actual situations and therefore lack empirical substantiation (Mythen, 2007). The details of his explanations of current social contexts and potential future idealised states need to be identified from more widely diverse settings and applications.

In summary of this Chapter, in order to move from the idea that responses to modern climate change can be explained through the application of the Beck's Risk Society concept, to the actual application of the theory, a thorough understanding of the central themes of risk society theory is required. These include aspects of the modern social context such as globalisation and modernisation, as well as risk society-specific aspects such as reflexivity and ever-present uncertainty. The concepts and characteristics, arguably, interact to form part of the 'drivers' that shape the nature of responses to climate change risks.

If the interaction can be mapped in some way, then a reference framework can be established that will allow for a critical assessment of a climate change response through evaluation against a background of various decision steps and the identification of the various influences that determine the perspectives that ultimately shape the specific responses. Based on the description of the nature of a modern risk society, Chapter 3 attempts to present such a risk society framework for climate change responses. The framework is graphically represented in order to review the preceding characterisation of risk society reactions, as well as describe further aspects that are material in the formulation of risk-based responses.

CHAPTER 3 FRAMEWORK: RESPONSES TO CLIMATE CHANGE IN A RISK SOCIETY

This chapter aims to detail a reference framework that will show how responses to modern risks are shaped in society, and locate climate change responses within the broader context of reflexive modernity. It starts off by comparing the pre-modern concept of linear developmental progress to reflexive modernisation, in order to highlight the changes in modernisation thinking that are advocated by the risk society theory. From this comparison, it becomes possible to identify the various aspects that contribute to risk responses, and each is discussed with the aim of furthering the understanding of their influence on risk responses. The critical difference between reflection and reflexivity, as described above, is also added to the new modernisation process. A framework is consequently developed that uses real-world practices or processes to frame the South African climate change strategy as a response to risk.

Framing Risk Society

The reflexivity inherent in a risk society differentiates it from traditional or earlier 'modernised' societies. Modernisation was previously visualized as a linear (evolutionary) social progression towards a particular developed ideal or shared meaning (Figure 3).

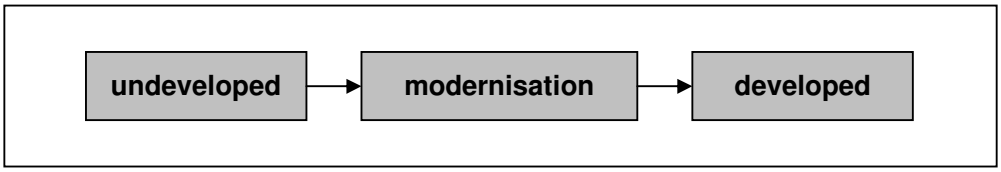


Figure 3: The linear progression model of early modernisation

According to risk society theory, however, this progression is a cyclical process. Modernisation in its current dynamic form gives rise to unintended 'latent side effects' in addition to the intended technological advances. These risks have to be responded to in some way or another, but the scale (often global) and nature (systemic, unseen and unpredictable) of the risks make the application of traditional institutions of modernisation inadequate (Beck and Willms, 1994). This 'second modernity' now requires new forms of social reaction or coping mechanisms. Consequently, instead of aiming for a specific destination state, a risk society applies modernisation as a response to modernisation risks in a way

which effects changes to the foundations of the modernisation process (Beck and Willms, 2004; Matten, 2004).

Beck does accede though that the two forms of modernisation exist simultaneously in modern societies as the distinction is specifically intended as a tool to facilitate a better understanding of the various integrated processes within a changeable modern social context that led to a deviation in the way in which society reacts to pressures (Beck and Willms, 2004). The presence of the reflexivity in modernisation is critical to the understanding of modern risks and responses, such as responses to climate change, since it is the reflexive characteristic of responses that would have them qualify as risk responses.

Between, and within the various components of reflexive modernisation a risk society, however, there exist processes of knowledge creation and application which take the knowledge of risks and transform it into a social response. This transformation is characterised by the interplay of diverse perspectives and interests that ultimately lead to the reflexive (or reflective) application of knowledge and change. Therefore, if a framework can be conceived that can provide an explanation of the dynamic process that lies between the creation of risks and the generation of appropriate responses, then a better understanding of the operation of a risk society will be possible. It will also necessarily have to provide for a description of the process that diverts risk responses into reflective self-confrontation, and give direction to initiatives that aim to pursue Beck's ideal of a truly democratic self-critical society.

The following section consequently sets out to investigate some of the key aspects that influence the formulation of climate change risk responses in order to define and populate such a framework.

Risk Society Characteristics in the Climate Change Response Framework

Climate change responses in a reflexive risk society are determined by various characteristic processes inherent to the risk society concept. These have been identified and described by Beck (1992; 1999; 2004), Giddens (1990; 1994) and others (Lash, 1994; Bulkeley, 2001) as part of the discourse on risk society.

Broadly categorised, the main processes intrinsic to risk society, as illustrated in Figure 4, can be described as:

- Modernisation, in the form of social and industrial development
- Globalisation, and/or the reorganisation of social institutions in order to accommodate new forms of risk
- The creation and conceptualisation of risk (manufactured risk and manufactured uncertainty)
- Unintended (reflexive) response to risks

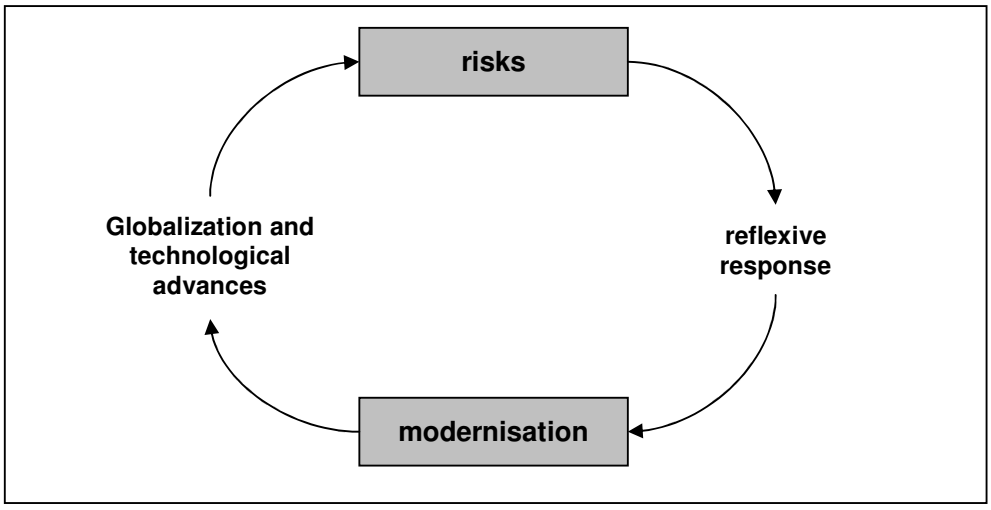


Figure 4: The basic cyclical process of risk response in a risk society

As indicated earlier, however, reflexivity does not exist unopposed within a risk society. Social, political, academic and scientific 'reflection' is considered a related but separate component of the late modernity of a risk society (Beck and Willms, 2004). How can the politicising of risk and its embeddening in society (political economy and social responses) as a 'reflection' on risks and risk perception therefore be fitted into the risk response framework so as to allow an understanding of the dynamic between it and reflexivity?

In order to answer this question, each aspect of the proposed framework is explored against the background of risk society. This offers insights into the interactions between the various components of the framework, as well as the roles that reflection play within the structure of a risk society. Accordingly, the narrative will first consider the role of globalisation, then the nature of risk conception, and lastly the formation of responses to risk.

Globalisation

The driving concept behind the risk society theory is the growing inability of society to cope with the effects of modernisation (Beck, 1996). Industrialisation and modernisation during the past century has become so successful that it is creating systematic unforeseen, unintended and unseen consequences or by-products of modernisation that cannot be adequately controlled, processed or absorbed through existing or traditional response systems. One of the ways in which the new risks are both created and, at the same time, accommodated in society is through globalisation (Giddens, 1990; Blowers, 1997). Put differently, globalisation in this context refers to the deconstruction and reconstruction of time and space in order to respond to equally disaggregated modernisation and risks.

In modern society, time and space have ceased to be static, unchangeable and limiting. Modernity has created connections between different times and spaces through means of global transportation, communications and inter-generational timelines. As a consequence, spatial and temporal limitations were removed from the modernisation process, and opportunities were created for organisations to operate independently of space and time in a universal globalised context. National boundaries have also receded as determining factors during the past century which saw the rise of global institutions, industries and corporations, the rise and fall of socialism and the conquests of capitalism. This mix created business empires that stretch across the globe and between multitudes of economic layers.

Unfortunately, this also means that the unexpected or unwanted by-products of industrialisation become as great in scale and pervasiveness. On a global scale, we are faced with a host of diffuse sources of pollution and degradation, with a sum total or cumulative effect that has implications on a similar global scale.

In the case of climate change, for example, we know that the burning of fossil fuels releases great volumes of carbon dioxide (CO_2) into the atmosphere. The global increase in atmospheric CO_2 concentrations is one of the lead causes of global warming, and has been clearly shown to be directly related the rapid industrialisation of the past century (IPCC, 2001; IPCC, 2007). Globalisation, however, makes it possible for companies to either source cheap fossil fuels

from, or locate polluting production processes in countries where the sourcing and burning of fossil fuels are the cheapest (Jotzo, 2004; South Africa, 2004). It is therefore likely that companies can pollute more on a global scale than if all the processes were located in a country with stringent emission controls, but this is difficult to prove conclusively as a result of the diffuse nature of globalised business (Oikonomoua *et al.*, 2006). The number of industries in the world further means that although individual companies might be compliant with standards, the cumulative effect on the globe is the substantial increase in carbon dioxide levels without any real mode of overall control. The problem is therefore of such a diffuse origin that effective control becomes difficult (Matten, 2004). Other examples of time and space independent consequences of modernity with definite relevance to climate change are globalised transportation systems, a consumer society, generally inefficient waste disposal systems, a reliance on carbon-based fuels, and a rising world population. All of these generate impacts of great magnitude that have an impact on our climate, but none of them can be effectively controlled due to the diffuse origins and global distribution of the impacts.

The disaggregation of time and space also means that industries and corporations now carry with them the ability to externalise unwanted effects. According to this business principle, 'bads' such as pollution, chemical contamination and resource degradation can be distributed amongst other parties or areas in order to disassociate the company from the cost of disposal or remediation. The nature of the global economic system offers multinational companies many opportunities for the division of production processes, and therefore also the ability to locate particular processes in areas or countries where the by-products will be easier and cheaper to dispose of. This process is an example of how globalisation can compound the unwanted effects of modern risks. The ability to globally redistribute negative effects means that global systems of inequality or differential development strategies can act as channels for the concentration of unwanted effects (Lacy, 2002; IPCC, 2007). Risks are really determined by actions within particular contexts, and therefore it can be said that where you live and how you do things will determine your particular risk situation. A developing nation that depends on primary economic sectors with no opportunity for voluntary, non-essential environmental improvement that could lead to sub-optimal profits, for example, will necessarily be more vulnerable to

climate change related impacts, but at the same time also more guilty of contributing towards it. This gives rise to the suggestion that pollution favours the poor, as the 'beggar' nations of the world cannot be 'choosers' when it comes to foreign investment, irrespective of the pollution it may bring along (Beck, 1992; Blowers, 1997).

Another aspect of particular importance is the latency of climate change impacts. Many modern industrial or business systems will generate large-scale impacts that will possibly only become substantive sometime in the future (Lacy, 2002). This intergenerational aspect of climate change impacts is very relevant when considering response strategies, as the reactions need to take cognisance of these time-independent impacts, and offer long-term strategies on how to deal with them (Layton and Levine, 2003).

Globalisation does not solely represent growing problems though. In very much the same manner in which it adds to modern risks, the growing interrelatedness of the modern world can offer innovative solutions to problems based on global cooperation and systems. This is one of the ways in which the 'normal' industrial era responses can expand beyond their customary ranges, and necessarily become part of a reflexive modernisation responses.

The global economic system, as an example, offers developing countries the opportunity to access development funding and foreign direct investment based on advanced technological expertise that would otherwise never have reached these countries. As a consequence, this partly assists developing countries to make their industrialisation process both faster and less environmentally damaging than what was true for the countries that industrialised during the 20th century. Global cooperation in the realms of science and information sharing further means that efforts at understanding and responding to climate change risks can become international, and based on a better spread of information sources.

Considered as part of a climate change response framework, globalised innovation becomes part of a link between an awareness of risks and an eventual innovative response.

Manufactured Risk

The knowledge that society has of modern risks is predominantly shaped by expert systems that define what the risks look like and how significant they are (Blowers, 1997). It is this knowledge that defines the outcome of the self-confrontational 'reflecting' on modern risks. Two concepts, namely expert systems and manufactured risk, need to be investigated as main contributors to the comprehension of risk, and as further illumination of where and how reflexive responses branch off into reflective reaction, and adding to a description of the reflecting process as part of the risk response framework.

- *Expert systems*

Modernisation involves disembeddening, which refers to a process whereby actors in society are distanced from specialist knowledge or complex processes, to the point where they have to rely on representations and proxies in order to relate to the highly diverse and dynamic modern social order (Giddens, 1990). We can, for example, no longer claim to have in-depth understanding of climate change. Instead, we are reduced to relying on the opinions of the participants of various expert systems who are supposedly more knowledgeable. Giddens (1990, 27) defines expert systems as: "*…systems of technical accomplishment or professional expertise that organise large areas of the material and social environments in which we live today."*

The emergence of expert systems is due to the highly diversified nature of our modern world, and the concomitant rate of specialisation. It means that knowledge niches are created in all aspects and spheres of society, and that these become the domains of those who have the relevant specialist credentials. Without the necessary credentials, one cannot be considered a specialist, and society will not allow you to operate an expert system as one. The end result is that we become reliant on the information, advice, support, and associated networks of other expert systems in order to function in our own niche.

The complication that arises, however, is that expert systems also possess the specialist knowledge required to critically evaluate them (Demeritt, 2006). This means that non-experts have to rely on expert knowledge of the expert systems,

in order to make an informed decision about the appropriateness or correctness of the knowledge or expertise held by the expert system.

The implication for climate change response strategies is that non-expert policy makers need to rely on expert scientific fields to inform their policies. However, the only way to know whether these advices are correct and relevant is to obtain advice from even more experts (McCright and Dunlap, 2003). Beck (1999) considered such critical self-confrontation to be separate from the reflexive response that a risk society displays. According to him, this awareness of shortcomings and conscious decision-making about risks represents reflection rather than reflexivity. The reflection adds to an inherent uncertainty in policy-making and its eventual uncertain effect.

Of particular concern is the fact that the reliance on expert systems in modern climate change and risk society contexts means that areas such as the definition and conceptualisation of risks become areas of specialist knowledge and the information generated in these areas become the foundation of all other processes of policy compilation, without any external review being possible (Munnichs, 2003).

- *Manufactured risk*

Beck's 'risk society' is characterised by the advent of globalised, intergenerational risks (Beck, 1992; Bulkeley, 2001). As opposed to environmental risks that previously threatened individual communities, settlements or regions, the new category of risk poses a hazard to multiple nations or even the entire world with effects that can extend beyond one generation. Beck evaluated the examples of acid rain and nuclear installations, but also referred to climate change and global warming (Beck, 1992, Beck, 2006). These risks are all 'manufactured' in the sense that they generally exist as by-products of industrialisation and modernisation. Although the sources of the risks are usually found on local scales, accumulation and interaction with global distributative forces have the potential to affect the livelihoods or conditions of societies across the globe.

The threat of climate change has to do with a global shift in climate patterns, due to changes in key constituents or interactions of the climate system. Climate change is therefore inherently global. Global circulations will redistribute any

factor that forces changes to the system or pollutants through climatic forcing effects. The impacts can therefore manifest at a completely different part of the globe (ozone layer depletion), or at several interconnected locations (El Niño effect), or even be universally distributed to affect all parts (global warming) (IPCC, 2001). Small-scale regional changes due to direct influences are therefore not the concern – rather the global patterns of surface or atmospheric temperatures, precipitation and oceanic circulations. This implies that climate change has globalised risks that neatly fit into the risk society framework.

Science is particularly to blame for the manufacturing of unintended consequences that affect our climate (Beck, 1992). CFCs for example, were originally developed as very stable, cheap and effective propellant and cooling agents. However, as time went by, science realised that the previously 'harmless' group of chemicals were dissolving the protective ozone layer. The impact was unexpected, globally significant, and required concerted global efforts to reverse (Beck, 2006). Similar unexpected chemical reactions are undoubtedly occurring as a result of the release of increasingly more artificial and complex chemicals into the environment as by-products of scientific and industrial progress.

The label 'manufactured' also refers to the knowledge we hold of the risks. Who knows what climate change impacts can be expected? International donors, development planners, conferences and academic papers, governments and both developmental and environmental activists alike wave the banner of climate change in support of their particular call for action, but although there is a general sense that climate change is real, no consensus has been reached on the exact dimensions of the threat (Giddens, 1994; IPCC, 2001; IPCC, 2007). Many scientific findings are available to prove or disprove claims and statistical analyses are used to the same effect. This is clearly a case of expert systems, as conceptualised by Giddens (1990), being in control of both the technical knowledge of, and professional expertise around a particular facet of modernity.

Ultimately, society has to be satisfied with the use of perceptions, more than expert knowledge and certainty, to determine what is accepted as truth. Our world of uncertainty therefore creates socially constructed hazards and quasi-objects (manufactured uncertainty or risk) that are used to invoke change. This is realized by allowing perception of future impacts to determine and define present

management of the risks. A risk society comes about through modernisation that has progressed to the point where it is not trying to use or master the environment, but rather to minimise the risks that 'natural' hazards pose to production – e.g. environmental disasters or loss of access to resources. Risks can therefore become a new source of conflict and social formation. Interestingly, the new state of society has to adjust to a negative trade in an unwanted good, as opposed to previous attempts to monopolise goods and services (Van Loon, 2000; Matten, 2004). Risks are therefore managed (delimited and redistributed) to achieve two things (Beck, 1992):

- They may not hamper the process of modernisation
- They may not exceed what is ecologically/medically/psychologically/ socially acceptable

The risks that we do respond to are, however, determined by our place in the global system. Although everyone faces the same global warming risk, not everyone feels compelled to do anything general about cutting the emission of greenhouse gasses. In South Africa, the focus is more on the risks posed to local development issues.

The *'Big Question'* to be answered, however, is how do we define the parameters of 'significant risk'? Self-confrontation in science immediately comes to mind since, as creator and conceptualisor of the risk, it should also have the power to define the parameters of a particular risk. However, as argued by Beck (1999) society seldom uses science as the only foundation for decision-making in a reflecting state. Other influences that include politics, economic interest and limited legal definition contribute to a final knowledge of risks. Consequently, many subjective influences may determine the immediacy and extent of conceptualised risks, and hence also the response thereto. The uncertainty that is created or employed throughout this process therefore needs to be considered as an integral part of the risk response framework since it may prove central to identifying gaps, weaknesses or inconsistencies in climate change responses.

Contradictory Science

The understanding that society has of modern climate change risks is presently characterised by uncertainty and conflicting scientific opinions. Nevertheless, it

remains these perceptions that shape responses to risks. The framework of Figure 4 can therefore be expanded yet more, by adding scientific self-confrontation and risk perception to the missing 'reflecting' state.

- *Manufactured uncertainty*

The basic inability to accurately define and prove climate change risks empirically increases the uncertainty around those risks. This inability is due to the future threat of climate change ultimately only existing in computer algorithms or theoretical arguments. Any research on the subject is therefore nothing more than an attempt to see into the future. Decision-makers have to rely on proxy indicators such as historical scenarios or mathematical representations of an inherently chaotic climate system. It therefore generates uncertainty by creating or conceptualising risks that can never be entirely exact, since (according to risk society theory) the response to the risk will prevent verification thereof. The elimination of ozone-depleting substances, for example, prevents science from knowing the real extent of their threat. The risks are therefore artificial or manufactured, as they are known only through conceptualisation by science or popular opinion. Within such prediction models, it becomes painfully obvious that any uncertainty in base data will be present in the ultimate findings as well.

The inability to isolate 'nature' from the social sphere has also gone beyond a positivistic perspective regarding social manipulation and impacts on what we consider 'natural' (Beck, 1999; Beck, 2000). Recently, the differentiation between the products of society and what is considered natural eroded, allowing the concept 'environment' to replace 'nature' (Escobar, 1996). The 'super concept' of a social environment has therefore become self-confrontational in that it is both the cause and response to its greatest environmental threats and risks. Since we cannot differentiate between a natural risk and a man-made one, it is easier to argue that all risks can be accepted as extensions of natural risk over which we should not have control. Such a re-definition can also serve to redefine the risk relative to the context in order to make it more acceptable, or keep it within limits.

The risks that we identify should, however, not be confused with the uncertainty through which they are known (Stirling, 2003). If the extent of the uncertainty is known, then it increases the understanding and comprehension of the actual risk, which allows for more appropriate responses.

The problem that arises is that globally universal problems become increasingly intangible, and therefore harder and harder to regulate effectively with local or even regional controls (Beck, 1999). As the divide between the comprehension of the environmental issues and their regulation deepens, so too does the separation between intention and action. Global agreements suddenly need to be devolved down through regional organisations, national governments, local regulatory levels, industry organisations and then individual actors who make the actual changes. The actors therefore might be too far removed from the original deliberations of the problem to really care about the implementation of the solutions. Such a state of uncertainty will potentially be easier to manipulate to the advantage of powerful players in the environmental politics arena.

- *Sociology of science*

Science by definition is realist, which implies that climate change science should be universal, unambiguous and unchallenged. The only basis for uncertainty in the climate change field would be *"…attributed either to ignorance when non-experts misinterpret the probabilities, or a lack of data that prevents rigorous calculations"* (Howes, 2005, 5-6). In a reflecting risk society, however, risk perceptions are more than just definitions of hazards or threats. Modern risks are perceptions – social constructions infused with politics, opinions, half-truths and uncertainty. This constructionist view holds that different social systems will 'construct' risks according to subjective recognition and understanding, as well as give them meaning in relation to a specific context (Howes, 2005). This apparent divide leaves science in a state of uncertainty, since value-laden perceptions require value-added analysis that rational science is not necessarily equipped for (Demeritt, 2001).

In trying to bridge the divide and account for socially divergent perspectives on the risk that climatic change poses, climate change science has to renounce its monopolistic claim to rationality since science itself is *"…one of the causes, the medium of definition and the source of solutions to risks…"* (Beck, 1992, 155). Conflicting claims, interests and viewpoints of the various agents of modernity therefore needs to be considered as a valid part of the conceptualisation of climate change risks. The resulting self-reflection ultimately becomes part of the

reflexivity of modernity, and has far-reaching implications for the sanctity of the scientific realm:

> *"Where the sciences and expert disciplines take up and examine their foundations, consequences and errors in reciprocal relationships, the same thing happens to expert rationality as happened to lay rationality in the triumph of science: its defects become recognizable, questionable and capable of arrangement and rearrangement. The environmental issue penetrates into all occupational fields and becomes concrete and manifest in substantive controversies regarding methods, orientations, calculation procedures, objectives, standards, plans, routines, and so on" (Beck, 1999, 99).*

Beck (1999, 58) makes a further strong point when indicating *"It is the success of science which sows the doubts as to its risk predictions."* In terms of climate change risks, it means that the growth in climate change science (in terms of both understanding *and* uncertainty), in combination with the self-criticism of the scientific method have led to an undermining of the basic principles of the field (Giddens, 1994; Healy, 1997). The end result is divergent scientific answers or contradictory certainties that are all equally feasible and credible, since they are all based on reliable and acceptably reasonable assumptions (Stirling, 2003). This insight should not be regarded lightly, as diverse opinions can be abused in many ways.

The implication for the risk society thesis is that the concept of risk cannot be accurately defined and measured, hence leaving the decisions drawing on the risk evaluations highly susceptible to subjectivity and consequently 'unreliable' or contestable. As Stirling (2003, 38-39) indicates:

> *"…there can in principle…be no effective analytic means definitively to compare the intensities of subjective preference…" and "…[it] is impossible under the rational choice paradigm to guarantee any definitive aggregation of preference orderings in a plural society."*

The contestability of climate change risks naturally slows down responses, and allows the risk to grow amidst the uncertainty. This occurs on several levels. Firstly, the existence of the threat can be denied until 'scientifically' proven. Science remains the only way in which we can verify the existence of climate change, since climate change has no symptoms that can be discerned by human senses. One could argue that the effects of climate change will be experienced, but even climatic variables need to be proven to be statistically meaningful before we have 'proof' that climate change actually exists. Thus, until enough scientific consensus is reached, we will not be in a position to argue against the causes of climate change, and the dangers can grow. Beck (1992, 71) puts it rather succinctly:

> *"Sooner rather than later, one comes up against the law that so long as risks are not recognised scientifically,* ***they do not exist*** *– at least not legally, medically, technologically, or socially, and they are thus not prevented, treated or compensated for" (Emphasis by original author).*

Secondly, adherence to scientific rigour implies that the more we intensify the inquiry, the harder it becomes to maintain a global understanding of the complex dynamics inherent in the global interactions that drive climatic processes. This is a direct result of the unearthing of a multitude of variables due to a quest for greater scientific accuracy, without actually getting to a point of completing the puzzle. Ultimately, this reduces the number of risks that justify reaction, whilst at the same time legitimising the rest through the scientific uncertainty (Beck, 1992).

Scientific self-confrontation becomes a third delaying tactic. Science of a higher standard of accuracy is allowed to level criticism at less detailed work, since the more detailed work is likely to question the broad assumptions used by more general science. This places the conclusions of the original work in doubt, and again offers opportunity for risks to escalate until sufficient consensus has been reached (Beck, 1992).

A last point that is very relevant to the creation of scientific knowledge is related to the dissemination or use of the knowledge. One of the assumptions of statistical risk science (the need to understand risk so that it can be controlled), as a form of pure positivistic science, is that we are able to communicate

scientific findings and recommendations adequately (Patt and Dessai, 2005). In a fast-paced modern society though, the information used to inform opinions and decisions are generally obtained from mass media. Mass media is, however, subject to public opinion in terms of decisions over what is considered communication-worthy, and has to abbreviate scientific information and interpretations. Since climate change risks are invisible and based on causal interpretations – in other words, they exist only on paper or through scientific deductions and thus subject to social definition - the severity of a risk can be misrepresented or misunderstood, or the explanatory detail lost (Lomborg, 2001).

The uncertainty that has become inherently part of late modernity creates conditions that are favourable for the presence of reflection as a counterpoint to, or even a component of reflexivity. As the discussion above explored, it is the certainty of uncertainty that makes it possible to vary our knowledge of risk almost at will. As the debate grows, so does the scale of reflection, and hence the amount of risk response that is diverted from the unaware, reflex reaction cycle to a more conscious and deliberated response that might not lead to reflexive modernisation.

Ecological Political Economy

- *Knowledge and power*

A fundamental aspect of a *reflecting* (self-aware and self-confrontational) risk society is the understanding that decision-making is driven by politics rather than rigorous scientific discipline. What this means is that popular and political intentions, and by implication dominant social power structures and influential groups, steer consensus over what are considered the most important social, economic and environmental problems and therefore what should be done about them. This perspective on decision-making can be seen as an analysis that ascribes power to the combination of various powers and knowledges in society, typical of the worldview held by Michel Foucault (Hajer, 1995). According to Foucault, socio-political and historical forces shape power systems in society through the use of reasoning that both defines and legitimises them. The 'reasoning' resides in the monopolisation of knowledge in a manner that will maintain the existing power base – described as a process of epistemic sovereignty (knowledge that is sanctioned) (Rouse, 1994). Knowledge and

information can be monopolised by steering disciplined investigations according to what is considered 'serious' and useful to whoever is doing the directing, since scientific or academic research are usually slanted towards topics of popular interest, or directed by the financial or other interests of corporate funding or research institutions. The power structures that operate within society therefore also holds sway over the conceptualisation of environmental risks since these parties have the power to both define the questions (what should be investigated) and the answers (who's opinion is acceptable/important, or which thresholds or methodologies are acceptable). Usually, the answers relate directly to solutions that will reinforce the sources of influence held by power structures (Beck, 1992) in the sense that agents or groups with the necessary power or influence can determine what the most important (environmental) problems are, and then what resources will be used to find solutions and implement them (Lomborg, 2001).

- *Subpolitics*

World-shaping decisions are consequently being made outside the scientific arena, and are intended to prevent or manage social response to perceived problems by finding generally acceptable solutions. The influence coming from the political arena might be based on formal politics and power systems, or alternatively on what Beck (1992) terms sub-politics. According to this view, formal politics only encompasses the political debate within debating structures such as parliament. All other decisions that are taken outside these arenas, even if they eventually inform the political debate, qualify as subpolitics. Subpolitics is present where knowledge is created and decisions are made outside the realms of specialist knowledge, through:

> *"…**ad hoc** individual participation in political decisions, bypassing the institutions of representative opinion-formation (political parties, parliaments) and often even lacking the protection of the law" (Beck, 1999, 39) (Emphasis by original author).*

Hajer (1995) gives the examples of laboratories, scientific councils, environmentalist movements and media campaigns as arenas where subpolitics occur, with Blowers (1997, 850) identifying the *"conflicts between interests"* of business, nation-states, intergovernmental organisations, science and environmental groups. All such subpolitical locations or structures offer

opportunities for negotiation and subjective decisions that can then be used to inform the political debate on the basis of an 'expert knowledge and recommendation'. Such expert systems cannot easily be challenged outside the realm where they were conceived, and can therefore remotely determine political decision-making. In addition, the concept of a 'public' can represent another subpolitical extension of the political process though the dissemination and support of popular opinions.

By implication, we have politics that infuse the realm of knowledge creation as well as the various fields of knowledge application. On the one hand, it infiltrates the sphere of specialist knowledge creation, but on the other, popular opinion on scientific subjects or perceptions of risks is commonly based on superficial media reports that were intentionally sensationalised. The popular opinion then informs political or economic positions within the democratic system, leading to major decisions being made without the benefit of sound specialist advice. This is especially true in situations where specialist knowledge about indefinite risks such as climate change might be hard to come by or difficult to comprehend. The more complex a problem, the more leeway it has to spread and intensify before the effects can be identified, classified, quantified and reported on (Beck, 1992).

Subpolitics can therefore, based on different perspectives on the same subjects, continuously influence decision-making, knowledge creation and knowledge application whilst it generally plays into the hands of powerful structures or institutions that need to protect their economic interests. In combination with subjective or non-independent media, it will also feature as a polarising force in the global arena.

If we therefore accept that it is possible that the global consumption-driven political economy is driving environmental research, then it becomes a real possibility that the environmental problems of the day are mere reflections of threats to continued resource exploitation since these would be the topics that find exposure in the media. The responses to the threats are therefore similarly informed by economic drivers.

Subpolitical activity and influence affect many aspects of our world, and probably all aspects of environmental science. Lélé (1991, 616) for example, describes the

concept of sustainable development in a manner that refers to subpolitical influences:

> *"Given this confusion in terms, perceptions and concepts, the policies being suggested by the mainstream of sustainable development thinking cannot and do not conform to the basic idea of ecologically sound and socially equitable development. They are often seriously flawed, and reflect personal, organisational and political preferences."*

Similarly, Howes (2005, xxii) identifies the various levels of influences, which includes subpolitical action, of the environmental movement:

> *"This diversity of structure, size and purpose is reflected in the variety of strategies adopted by the [environmental] movement. These range from behind the scenes lobbying and letter writing campaigns to consumer boycotts, protests or direct actions, taking legal action and even running candidates for office. More recently, groups have sometimes adopted a partnership approach that enables them to work with individual firms or governments to improve environmental outcomes."*

- *Public opinion*

Subpolitics in the public sphere are related to the uncertainty on which decisions are based. In risk societies, social action and reaction are determined by perceptions of risk, not actual scientific validity (Beck, 1992). Beck (1999) describes it as a particular state of being between security and destruction, since our perception tells us that things are not alright, but we cannot fully understand the threat since our actions are preventing the risks from becoming reality. The implication is that we act and make decisions on the basis of future happenings:

> *"…the actual social impetus of risks lies in the **projected dangers of the future**. In this sense there are hazards which, if they occur, would mean destruction on such a scale that action afterwards would be practically impossible. Therefore, even as conjectures, as threats to the future, as prognoses, they have and develop a*

> *practical relevance to preventative actions. The centre of risk consciousness lies not in the present, but* ***in the future****. In the risk society, the past loses the power to determine the present" (Beck, 1992, 34) (Emphasis by original author).*

The really challenging aspect is that our actions are in fact preventing the 'future' from ever occurring. It means that our freedom of decision-making is not informed by real consequences (Beck, 1999). On the other hand, however, the uncertainty of the risk society knowledge base means that we are not bound by politics, law and science to the same extent as in previous social orders. We are at liberty to act on the perceptions that we hold and the levels of risk that we deem acceptable (Lacy, 2002).

Public opinion is unfortunately at risk of resorting to 'moral' or 'risk' panics – sudden flashes of interest in challenges to the *status quo* (Cohen, 1980). Such panics occur whenever "*A condition, episode, person or group of persons emerges to become defined as a threat to societal values and interests;"* (Cohen, 1980, 9). Perception of the threat is therefore paramount, and for this reason moral panics are highly reliant on societal agents with the ability to shape public opinion. Cohen (1980, 9) specifically identifies the mass media, political figures and expert systems:

> *"…[the nature of moral panics]…is presented in a stylised and stereotypical fashion by the mass media; the moral barricades are manned by editors, bishops, politicians and other right-thinking people; socially accredited experts pronounce their diagnoses and solutions;"*

A 'moral panic' centred on climate change would therefore have two dimensions:

1. the nature of the conveyance of information on the issue, and
2. the interests and agendas of social agents that use information on the particular issue.

The first dimension is firmly rooted in the uncertainty of risk society knowledge systems. In this information age, a myriad of different messages get conveyed through mass media. A message with some sort of public appeal (such as

climate change, which has appeal through its universality and scale) could therefore easily lead to a risk panic. Scientific research and debate would therefore be called in to explain the issue, provide answers and solutions, but also to provide legitimate support for particular viewpoints. The publicity that the issue gets within the mass media means that the media could be used as a medium to fuel further panic, convey personal agendas or garner support for ideas or persons.

On a political level, politicians, academics and other persons of social standing rely on the support of voters or power interests, and they therefore respond to popular topics such as climate change in order to keep the public satisfied and powerful allies reassured. Should a risk panic strike, they need to show that they are taking an action or at least taking up a position on the subject. The consequence is that the issues of the day in public rallies and political forums come to be driven by subpolitics rather than objective science. In Cohen's words (1980, 191):

> *"Magistrates, leader writers and politicians do not react like laboratory creatures being presented a series of random stimuli, but in terms of positions, statuses, interests, ideologies and values. Their responsiveness to rumours, for example, is not just related to the internal dynamics of the rumour process…, but whether the rumours support their particular interests."*

Cohen's reference to 'magistrates' identifies a particularly important part of the 'moral panic' process – the vilification or legitimisation of the risk. A high profile environmental case could for example become subpoliticised through the uncertain context being created by intentionally biased court documents, urgent media reports and public pressure. The outcome of the case might lead to certain levels of environmental degradation being designated as acceptable by the courts and this process would therefore legitimise some of the environmental risks, leading to a smaller public outcry and consequently less public forcing of subpolitics. As easily, however, the opposite might occur – the legitimisation of the outcry through judgments that make pronouncements over environmentally degrading activities. (Also see Beck's example of the Brent Spar oil platform incident (Beck, 1999; Beck and Willms, 2004))

- *Formal politics*

The positions of power inherent in a formal political system rely on two broad spheres of support – economic interests and public opinion (Blowers, 1997). Economic interests include both business and international influences, and tend to reside in a structure controlled by elite individuals, families or enterprises and strive towards centralised power. In contrast, public opinion is represented by the democratic system and comprises a pluralistic power structure consisting of various pressure groups (Beck, 1999). The two interest groups will therefore be in conflict with each other at times, but the support of both is required to maintain dominance in a democratic political dispensation. Both should consequently be pacified by policies and responses to general risks such as climate change.

With respect to climate change risks, the interests of business and general industry (economic interests) will be served in two possible ways (Beck and Willms, 2004). Firstly, business must be protected from the actual effects of climate change, insofar as it might affect production, distribution or consumption of products. Unbridled modernisation that generates and fuels climate risks must be controlled to an extent that natural resources, the ability to distribute products and the consumption capacity of markets are not degraded by climate related influences. Industries will consequently strive to manage the climate-affecting factors that are perceived as threatening in a manner that will externalise any risks. Essentially, climate change responses therefore need to direct global modernisation in a way that reduces the risks posed *by industrialisation to industrialisation*. This reflexive situation implies a certain amount of introspection on the side of industries, which could potentially lead to changes in the way in which industries participate in the modernisation process. Secondly, in order to prevent external pressure from eroding its control over production processes, industry must avoid being exposed as guilty of contributing to climate change or opposing climate change related interventions. Whether through government regulation or consumer pressure, powerful economic entities will resist change that is external because of the loss of control that it represents. External pressure will tend to erode profitability unless the changes can be designed and controlled in a manner that suits industry.

A third, less defined manner of maintaining credibility is by ensuring political support. This is, however, a circular reference since economic interests form part of the system that legitimises political power. In fact, Howes (2005) found that with regards to environmental issues the governments of the United Kingdom, Unites States of America and Australia were all wary of either blaming or upsetting industry. Political support instead tends to favour policies that pursue GDP growth and employment levels. However, in some cases political support may actually translate into popular support if the political will and rhetoric can convince its supporters of a particular viewpoint – be that environmental or otherwise.

On the other hand, public opinion (democratic interest) on the whole will be supportive of a political power if:

- Risks are perceived as acceptable,
- The apportion of blame is accepted, and/or
- The controls over risks are considered adequate.

Risks will be accepted by anyone who feels powerless to affect the presence or nature of the risks, or in cases where the risk is considered not to be of significant concern. As discussed earlier in this report, risk perception is crucial. Political powers need to convince the public that the risks they face either don't exist, are not of substantial threat or can be controlled sufficiently. The advantage for the political system is that much of the public realm functions on selective information distribution, and it can therefore manipulate the treatment of information in a way that will support particular objectives.

- *Legitimisation and individualisation through uncertain science and law*

At the heart of the risk society theory lies the following quotation:

> *"For dangers are being produced by industry, externalised by economics, individualised by the legal system, legitimised by the natural sciences and made to appear harmless by politics" (Beck, 1999, 39).*

Beck implies that the dynamics of the global political economy play into the interests of global risks by legitimising acceptable limits of risk, whilst absolving

the sources of risks through organised irresponsibility (Beck, 1999; Beck, 2000). Policy responses to modern risks are vital in this system, since they play the dual role of legitimising acceptable risks and regulating the generation and distribution of risks. This of course also puts them at the centre of the power play between public and economical interests, warranting a closer look at the systematic factors that lead to the political will to generate and implement policies (Healy, 1997).

Scientific knowledge and legal procedures are the processes employed within the arenas of economics and public opinion to externalise and justify risks, as well as convey an assurance of the acceptability of the risk control measures. Both certainty and uncertainty in science and law are applied to achieve these objectives. Certainty in science can be used to prove or disprove a point, whilst uncertainty will be employed to cast doubt on a position or argument or establish ranges of acceptability (Bulkeley, 2001). Beck (1992, 173) picks up on the fact that scientifically acceptable arguments can be used to the advantage of powers within society, be it economic or political (or both):

> *"As they become more differentiated (and not necessarily as a result of their deterioration or moral fleetness of foot), the sciences, including the natural sciences, are transformed into* ***self-service shops*** *for financially well endowed customers in need of new arguments" (Emphasis by original author).*

The legal process will use scientific knowledge in the same way – certainty when a point needs to be proven and uncertainty when the certainty needs to be attacked or causality disproved. The disconcerting factor is the realisation that both the certainty and uncertainty can potentially originate from the very same scientific work.

The real danger in the climate change field is that the uncertainty inherent in a self-confrontational science will allow for certain thresholds of pollution, environmental change or degradation, thereby legitimising climate change risks. The legal process takes this legitimisation a few steps further (Beck, 1992; Blowers, 1997). Firstly, it will try and deny the causality of actions or the responsibility for the risks. Secondly, it will attempt to individualise risks in a manner that will focus on smaller components of the risks that are easier to

identify and comprehend, or focus on individual affected parties. Lastly, the legal process can be used to protect the legitimisation of thresholds against revisions that might lead to stronger control over risk generating activities.

From a precautionary environmentalist perspective though, the process of legitimisation has three inherent 'flaws':

1. The cumulative effects of risks (cumulative areas of impact or combinations of risks) are neglected when acceptable risk is defined individually.
2. Scientific findings are merely partially representative of real values, which add another level of uncertainty to the definition of acceptability.
3. It leaves the 'affected' to prove that they have been affected by the 'acceptable risk'.

These problems, however, do not prevent the ligitimisation of acceptable risks from proceeding and forming the basis of policies and guidelines.

- *Political Ecology and Social-Ecological Resilience*

Per definition, policies, guidelines and standards represent the attempts by political, economic and social systems to regulate activities and processes in order to steer them in generally acceptable directions. Any environmental response, and therefore also climate change responses, can consequently be viewed as an outcome of the congruence between environmental matters and social systems. It therefore becomes important to consider the system of interaction over and above the individual components, and hence see climate change responses as part of a political ecology.

> *"Reflexive modernisation is the age of uncertainty and ambivalence, which combines the constant threat of disasters on an entirely new scale with the possibility and necessity to reinvent our political institutions and invent new ways of conducting politics at 'sites' that we previously considered unpolitical" (Beck, 1999, 93).*

One of these historically 'unpolitical' areas described by Beck is ecology, since the natural sciences always commanded an unchallenged sovereignty over its

sphere of knowledge. However, natural resources such as land and raw materials have equally become arenas of political and economic debates, and it has therefore become necessary for ecological debate and response to enter the political realm in order to influence socio-political and econo-political decisions. In fact, even scientific knowledge itself has become a commodity that can be traded since it has a seminal influence on production systems and their legitimisation. Generally speaking, political ecology is the field of study that analyses the influence that social, state, corporate and transnational powers have on creating or exacerbating environmental problems and influencing environmental policy (Gray and Moseley, 2005). It therefore provides for a perspective on natural resources that is aware of the influences of power systems in society as well as the relationships that are present between entities and systems of power.

Political ecology has, however, found a of field of application in a recent discourse that evolved out of ecological resilience science that echoes the search for a greater understanding of the social sphere when dealing with historically 'natural' systems, namely social-ecological resilience. Resilience refers to the ability of a dynamic system to withstand changes to the influences affecting it, and that is typically what resilience studies have described. However, when applied to a social context, resilience also refers to the adaptive capacity of a social system and its potential to change to more or less of a desired state of relative stability (Folke, 2006; Gallopín, 2006; Smit and Wandel, 2006). Social adaptive capacity would rely on the various economic and political power systems and the interactions between them present within the particular social context, and hence the relation to political ecology. In combination, the concepts require scientific inquiry to not only describe the various influences on a social system and its ecological context, but also evaluate whether the system should strive for resilience or rather adapt to change by progressing to a different state of relative stability (Tompkins and Adger, 2004), and inform the actors responsible for driving the change on how to achieve the desired state (Vogel *et al*., 2007). A considered position on where and how resilience should be achieved will have an influence on response strategies and their level of self-confrontation or reflexivity.

The Different Responses – Policy, Regulation and Self-Regulation

The final part of the framework presented in Figure 4 that requires further consideration is the process that lies between the risk response and further modernisation – the actual manifestation of responses to risk. This transformation of risk response into real action can take two forms – either the actors of modern society will change on their own accord (self-regulation), or society needs to rely on official response policies (policies and regulation) to direct action. It is necessary to explore some of the salient aspects of these determinants of action, since the response strategy under review in this study contains elements of both categories, and such an analysis would provide guidance on how to understand the functioning of the NCCRS within the climate risk arena.

- *Policy and regulation*

Responses (direct or indirect) to environmental risks need to be regulated in order to maintain a culture of best practice amongst similar companies and ensure that the changes do not merely create even worse problems. In a complex social system, many different types of response strategies are possible, and each response will have a particular sphere of application, proponent and medium of control. All official responses can, however, be classified according to their legal basis as either policy or regulation.

Policies can be considered as the backbone of response strategies, but at the same time they also function as responses in themselves. In essence, a policy needs not be any more than a position statement. However, in order to provide further guidance, they can also extend to contextualisation and specific guidelines. Contextualisation will provide opportunity to better motivate the policy, whilst the guidelines would make the policy practical.

Inevitably the causes behind a reaction will determine the actual outcome. The motivation behind a policy therefore reveals a lot of the perspective and pressures that gives rise to the final policy. The implication for climate change policy is therefore that the drivers behind the policy will probably be instrumental in determining who or what is ultimately compromised or benefited through regulation.

Regulation on the other hand refers to any active attempt at managing a process or action in order to control its outcome. Regulation has three dimensions (Hajer, 1995):

- The need to define what is regulated,
- The need to contain (satisfy) social reaction against the aspect that is regulated, and
- The resolution of a problem or remedy to a situation.

From a perspective of risk society responses, however, these dimensions could respectively represent:

- Conceptualisation of risk,
- Quantification of risk, and
- Management of the redistribution of risk.

This implies that attempts at regulation could, intentionally or unintentionally, be mere reflections of social concerns watered down due to industry pressure or completely fail to reflexively affect the manner in which risks are created through modernisation.

Howes (2005) lists the following as the ways in which changes in environmental performance can be effected:

- Regulation
- Specifying technology
- Specifying standards
- Setting ambient standards
- Economic prompts such as incentives and disincentives
- Information war (public embarrassment, public relations, environmental impact assessment)

Current best practice international policy tends towards the setting of standards rather than the specification of technology, since standards allow industries more flexible choice in how to meet the objectives (Howes, 2005). An example is the Carbon Credit/Clean Development Mechanism process which allows industries to best determine the manner in which they would like to meet emission standards,

as opposed to being forced to implement less optimal or more costly changes that ultimately strive towards the same standards.

- *Erosion of regulation*

The trend in the past few decades has been for environmental threats to reach global proportions far quicker than the awareness of, and response to the threats (Beck and Willms, 2004). Typically, national regulation over individual potentially damaging activities continued, whilst a global problem was growing because of the insufficiency of the control or the lack of a globally appropriate integrated strategy. This is demonstrated quite clearly by the reactive nature of the various international agreements over environmental regulation such as the Montreal and Kyoto protocols. In actual fact, self-regulation by industry often outpaced international agreement on regulation – take for example environmental reporting by industries that might have preceded any government attempts at creating inventories.

Various factors aggravate the erosion of traditional control over environmental issues (Matten, 2004). For a start, the uncertainty and lack of scientific evidence on environmental risks make their regulation uncertain since even though catastrophes become the only certain confirmation of a system's limits, the reflexivity of society ensures that our response strategies prevent the actual residual risk from ever being known exactly. Further, the modern risks have diffuse origins, and are therefore difficult and unwieldy when it gets to regulation.

Matten (2004) also found that fragmentation of responsibility, division of labour, division of production processes and specialisation lead to the inability of individual institutions to adequately address such many faceted problems. Often, the risks are managed according to indicators or surrogates, which can lead to misappropriation of blame and focus – like blaming emissions for the impacts of an entire industrial system. As indicated earlier in this report, the globalised character of industry contributes to this problem of diffuse origins. Even though a multinational company might be headquartered in one place, it needs not have any of its environmentally degrading activities within that particular country. All of its production processes could relocate in countries with less stringent environmental regulation, and it could potentially even be shifted between countries depending on the changes in regulation. This results in regulation over

a particular company becoming subservient to regulation over its individual smaller parts, and therefore ineffective in managing the total impact of the corporation. The end result is that uncertain responsibilities and points of control leave no one specifically responsible for the consequences of entire lifestyles or social systems that are causing inherently indeterminate problems. Beck describes this situation as organised irresponsibility (Matten, 2004).

Nation states cannot adapt fast enough to keep up with the reflexive society that is constantly adapting to globalised risk. Governments act on democratic consent, and therefore are reluctant to intervene in lifestyles and living standards, leaving environmental regulation to become outdated too soon. Further, since globalisation is inevitable, and we need to recognise its implications. One of the core implications is the growing divide that opens up between traditional regulatory systems and contemporary risks. As Beck (2002, 4) puts it:

> *"The novelty of the world risk society lies in the fact that we, with our civilizing decisions, cause global consequences that trigger problems and dangers that radically contradict the institutionalized language and promises of the authorities in catastrophic cases highlighted worldwide."*

He goes on to state:

> *"…in an age in which faith in God, class, nation and the government is disappearing, the recognized and acknowledged global nature of danger becomes a fusion of relations in which the apparent and irrevocable constants of the political world suddenly melt and become malleable" (Beck, 2002, 4).*

What he implies is that traditionally, control over environmental matters was exercised by entities of a scale that did not transcend national boundaries, since the sources of environmental risks or the risks themselves did not transcend those limits. Environmentally degrading activities and their effects used to be localised and therefore easy to manage, but the new face of environmental threats are, however, global in nature, since everyone contributes to some extent to their origin and the effects are also distributed throughout the world (Beck and Willms, 2004).

Globalisation and the need to then manage globalised risk has since, however, given birth to supernational regulatory structures such as trade agreements or power blocks, and even the multinational corporation as trans-national regulator (importing standards or self-regulating) (Matten, 2004). As Van Gennip (2005, 4) finds:

> *"Beck discerns a shifting balance between what were once considered global issues and those typically understood as local challenges. Increasingly, the latter need to be posed, discussed and resolved through* ***transnational*** *frameworks. Politics and states have not caught up with this imperative, although many non-governmental actors have begun to think and operate along these lines. Beck suggests that over time, we could see a reinvention of politics. For example, the creation of* ***cosmopolitan*** *parties, perhaps akin to the groupings that today operate in the European Parliament" (Emphasis by original author).*

A significant difference, however, exists between the sources of risk and the efforts to control them. Whereas global risks may be generated by individual multinational companies with convergent intentions, the matching controls often rely on politically negotiated responses pieced together from divergent priorities and strategies. Multinational corporations also have both economic power that often exceeds those of governments and political power (such as the power of transnational withdrawal), which make them powerful forces and strong influences in world politics (Beck and Willms, 2004; Matten, 2004).

Regulation of the global threat therefore can only adapt in two ways – it needs to transcend the limits posed by national boundaries, or it has to rely more on self-regulation. Both alternatives are, however, fraught with their own limitations. Even though regional or multinational regulation is more powerful than nation state control, the bigger the organisation, the more actors there are to disagree and participate in power struggles. In addition, it can be argued that the international forums are basically made up of collections of nation states, which are ultimately mere reflections of the power structures within their own boundaries. In addition to the general conflicts of interest, such multiparty strategic participatory bodies also need to investigate the relationship between values and science due to the

inherent uncertainty about risks, precaution and response (Stirling, 2004). Self-regulation on the other hand, however, concentrates power and control in the hands of the very actors responsible for risks and risk-causing influences, and by implication, they are vulnerable to self-preserving thinking and action rather than a rigorous scientifically argued restriction on their freedom.

- *Self-regulation*

Multinational corporations have political power as well as economic power and their responses to climate change therefore have the potential to contribute substantially to the global response. Different responses are possible though. Kolk and Pinkse (2004) indicate that corporate climate change strategies can be represented on a four-phase continuum that is similar to classifications of corporate social responsibility. On this continuum, the responses can range between reactions that deny responsibility, to proactivity, where developments are anticipated. In between, defensive (reluctant admission) and accommodative (acceptance of responsibility) modes are found.

In terms of practical application, the defensive posture can involve active opposition to an international climate treaty with emphasis on the costs involved and the lack of scientific evidence for global warming, whilst an opportunistic or hesitant strategy allows for companies to prepare themselves for regulatory and market changes, but with a cautious approach in public. A proactive approach would be for a company to create awareness about its apparent responsibility as well as to implement changes to its operations. This move will be triggered by real or perceived environmental reasons but also because it will offer market opportunities (Kolk and Pinkse, 2004).

Traditional state-led regulation of modern industrial processes progressively gets undermined by the advances in scientific knowledge and the levels of expertise internal to modern corporations. Specialised information becomes an item of trade, and regulatory institutions do not necessarily possess enough expertise to effectively investigate and interrogate the activities of modern industries. Where the traditional institutions fail, new institutions, strategies and actors start to act as regulatory force. This means that increasingly the responsibility or opportunity to shape regulation is being shared by government and private entities. Although this is not new, it certainly is increasing in influence (Beck, 1994). What is also

evident, however, is that government regulation or oversight will not disappear (Matten, 2004). This is due to the fact that nation states still remain responsible for creating an enabling environment for industrial and business activities, whilst also being influenced by factors outside of the economic realm and responsible for various aspects of the operation of an industry.

Self-regulation therefore becomes increasingly indispensable as the knowledge and expertise required for regulation become ever harder to obtain or comprehend outside of the specific industry (Matten, 2004). In a way, self-regulation becomes a form of 'reflexive regulation' – regulation that is based on a legal theory and related practical approach to regulation that is self-reflective and self-critical. This means that a legal mechanism, based on a self-reflective reaction can be used for practical regulation. However, drawing on the expertise and knowledge of players within the concerned industry means that the risk for a biased position is immense (Matten, 2004).

- *Symbolic politics (Greenwashing)*

Not all environmental responses have substance. According to Matten (2004) organised irresponsibility can manifest in climate change responses through the use of symbolic politics. Symbolic politics refer to the declaration of goals and measures as an end in themselves rather than a commitment to a desired future state. Intentions may be represented anywhere on a spectrum between window dressing or concrete actions, but may obscure a lack of substantive action to a point of non-action and non-regulation. This is particularly relevant to climate change responses since cost implications will inevitably follow substantive responses, and industries can therefore benefit from rhetoric that does not require costly change.

The use of symbolic politics is not restricted to industries, however, government can also use the diversion tactics to further its objectives. In this manner, apparently environmentally responsible regulation or policies may in lack guidelines for practical application, yet convey a message of governmental commitment to particular environmental issues.

Symbolic politics can work in the following ways (Matten, 2004):

- True intentions or outcomes can be disguised, such as a green tax used to supplement public income rather than ring fencing it for application in environmental causes.
- Uncertainty can be masked through generalisation – for example the banning of GMOs can gain support because it is acceptable, not because of real risk.
- Costs can be reduced if uncertainties can be used as proxy. Risk management could therefore negate the need for expensive scientific research.
- Integration by symbols – e.g. getting support for 'catchy' concepts such as 'reduce, reuse, recycle'.
- Communication of abstract ideas or broad concepts by reducing them to simple practical actions.

The implication is, however, that subversive intentions or structurally limited actions may hamper or prevent more comprehensive or action-based responses. A situation is created wherein no particular actor or actor can be held responsible or accountable to the public.

The Risk Society Framework

In terms of climate science and response therefore, both political and scientific understanding of modernisation need to inform the debate about how to deal with climate change risks. The global nature of the risks and drivers, however, also means that a consideration of the global political and economical relationships is required in order to understand and regulate transnational risk drivers in a world of nation-state control.

What should be noted from the above discussion, is that society does not always need to opt for the common interest solution, or the most accurate and objective information, and that not all responses qualify as reflexive or self-confrontational. Potentially, climate change responses in the form of scientific research and policy formulation may be reduced to methods of reducing the spectre of climate change chaos to a risk which can be mitigated or to which we can adapt *without* necessitating a material change in the basic process of modernisation or the

creation of modern risks. Also, economical and political entities such as oil companies or nations can obtain a grasp of the risk that enables them to react in a way that reduces their vulnerability to the risk, or redefine the risk, potentially at the detriment of other parties. The reaction may not even be 'real' in the sense that it translates to real action – the mere existence of a response policy could be used as 'proof' of awareness and response. Instead of all responses leading to a reflexive change in the modernisation process, circumstances are manipulated in order to accommodate the risks through means of adaptation and new descriptions of the risks. Response actions will therefore merely support the *status quo* of the modernisation process. Such a scenario, where risk is redefined or accommodated, is therefore a critical addition that needs to be effected to the basic framework of Figure 4.

Partial reflexivity could, however, be present where the adaptation actions lead to incidental changes to the modernisation process that changes the process on a fundamental level.

From the discussion presented above, it becomes possible to populate the basic framework presented in Figure 4 in more detail, as is seen in Figure 5.

In particular, it becomes possible to indicate how awareness and self-reflection becomes a parallel cycle, as a variation of the 'unaware' reflexive modernisation process. This mirrors Beck's explanation that these two forms of late modernity can exist simultaneously, are interconnected, and can therefore both lead to similar modernisation responses. It is therefore not possible to separate the outcome of a reflexive process from that of a self-confrontational reflective one since the two are merely layers of the same response process in society, and the distinction is artificial.

By implication, any response that results in reflexive, self-confrontational change, should be considered valid as part of a reflexive modernity and reflex action in society. The self-critical scientised, politicised and popularised debate that led to the decisions and actions must be classified as part of the reflective process though.

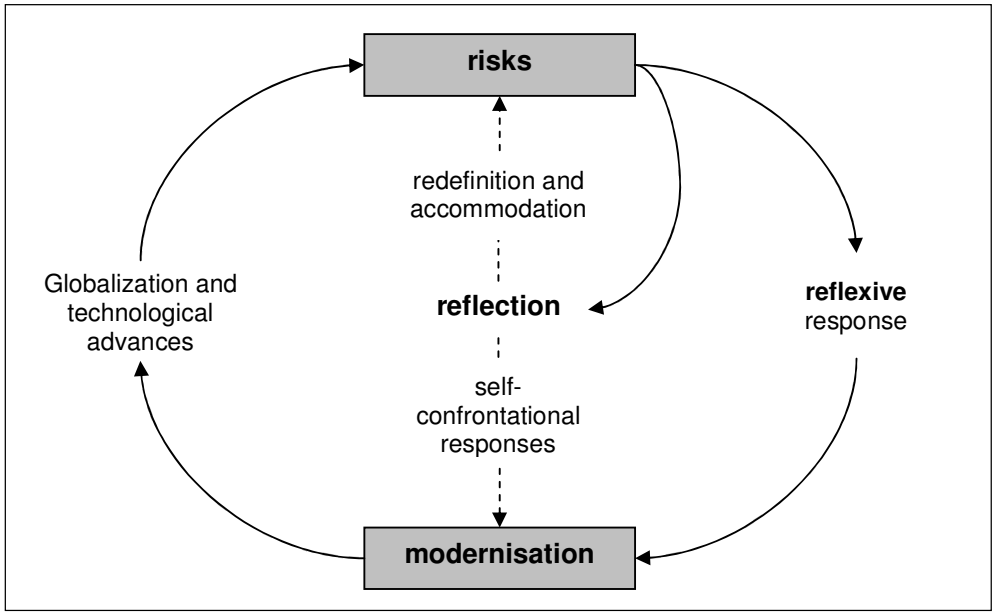


Figure 5: Risk and potential non-response in a risk society

The policy response under scrutiny in this report, the South African NCCRS, appears in the framework as an example of self-regulation and policy under either 'reflexive response', 'redefinition and accommodation' or 'self-confrontational responses'. The interchange between scientific knowledge, conflicting opinions, political and economic interests as well as actual policy responses that become evident in the framework, provides the particular aspects of a risk response that can be used to analyse the NCCRS in order to assess whether, and how, risk response determines the content and effect of the NCCRS.

This chapter deconstructed the process of generating policy responses through means of a conceptual risk response framework. The framework identifies the various linkages that exist as parts of the reflexive process that facilitates the transformation of knowledge into policy. From the description, it becomes clear that ecological politics play a central part in the policy compilation process, and that uncertainty is an inherent part of the science surrounding modern globalised risks such as climate change. What remains in this research, is to evaluate how well the risk society concept and risk response framework can now be applied in practice, and whether they offer any valuable contribution to the development of response strategies. The following chapter therefore describes the results of an evaluation of the South African National Climate Change Response in accordance with the risk response framework.

CHAPTER 4 METHODOLOGY: ASSESSING THE NATIONAL CLIMATE CHANGE RESPONSE STRATEGY

The National Climate Change Response Strategy

In order to examine the risk response framework proposed in Chapter 3 in a practical manner, the South African National Climate Change Response Strategy (South Africa, 2004) is selected as a case study. The National Department of Environmental Affairs and Tourism (DEAT), as shown earlier, published this South African response in 2004, following preparatory work under the auspices of the UNFCCC (Initial National Communication (South Africa, 2000)) and USAID (Country Studies Program (South Africa, 2003)). Reports and studies that formed part of these two programmes also provided a great deal of the source material for the NCCRS. Up until the latter half of 2008, it represented the principal reference document for climate change responses in South Africa and still provides a central framework through which response actions should be coordinated. It is therefore imminently suited as evaluation case study as it is representative of the response to climate change by the South African society in general, and as such, can be used as a proxy for the state of reflexivity achieved by the country as a whole.

The case study analysis is intended to achieve two aims - to establish how closely the South African strategy conforms to the description of a risk response, and to identify aspects of the risk society framework that might limit or offer further direction to climate change responses. It essentially entails a content analysis that offers the opportunity to test the risk response framework and evaluate it for relevance. However, the application of risk society principles to the current climate change response in South Africa also allows for a debate on the implications of the risk society theory for a developing country.

The analysis is presented in two parts: firstly a description of the data collection and research process, and secondly a discussion of the results.

Data Collection

As indicated briefly in Chapter 1, the first part of the research (Chapter 2 and Chapter 3) dealt with the conceptualisation of the research topic. It culminated in

both a reference framework for the analysis of risk responses and an overview of the characteristics inherent to a risk society. The ultimate aim of the research is, however, to determine whether the South African climate change response is representative of a risk society, and if so, how much. The reference framework from the first phase is therefore applied to the NCCRS as case study, in order to see how generally the framework applies and whether the original conceptualisation is accurate.

The analysis is based on a questionnaire that builds on the information gathered during the literature review and conceptualisation phase. The questionnaire was compiled by converting potentially relevant characteristics of risk societies into questions about the NCCRS, which allows responses to the questionnaire to be used as indicators of the presence of the characteristics in the response strategy. It must be noted though that this list does not lay claim to necessarily contain questions relating to all aspects of risk society since it is primarily focussed on the risk response framework as opposed to risk society in general. Further review and amendment of it, or similar question sets, is certainly encouraged.

The questionnaire was used in two ways – it was first applied by the author as a detailed analysis of the NCCRS document, and secondly distributed to a group of key participants in the climate change arena in South Africa in order to confirm or refute the author's assessment of the strategy and to identify further intricacies of the risk society concept.

This method was selected instead of a coding system due to the inherent terminological uncertainty and multiplicity present in risk society debates. For example, the concept of 'reflexive modernisation' is interpreted and used in three different ways by Beck, Giddens and Lash (Beck, 1994; Giddens, 1994; Lash, 1994). It is therefore extremely 'risky' to rely on specific identifiers in text and responses to point toward the presence of risk society and related concepts. In addition, negative responses were deemed as equally important to the investigation, but these may not be obvious by the mere absence of key terms and concepts. A more prudent approach is to retain the context in which such identifiers are located.

During the detailed review of the NCCRS document, both discourse and content analyses were employed. This was achieved by reviewing the summary and main

text of the strategy document separately and then comparing the reviews side-by-side. Such comparison interrogated the content for risk society indicators, but also allowed for the identification of differences in structure and content between the various parts of the document. It was deemed appropriate to also consider structural differences between the summary and main report, as these could have material influences on which response guidelines get to see practical application. The questionnaire with the document review of the NCCRS is provided as Appendix 2.

The second part of the data collection phase involved the circulation of the questionnaire to a group of key stakeholders during the latter parts of 2007. This control group was representative of civil society, academia and government sectors, with respondents targeted as a result of their close association with current climate change response policy work or original negotiations and debates that informed the NCCRS. They are therefore practitioners or stakeholders that either use the NCCRS as reference in their day-to-day activities or were involved in its development. Structured interviews were selected as preferred research method in order to obtain qualitative, but comparable responses from the respondents. The structured nature further meant that in cases where access to respondents were problematic, the interview structure could be used in a self-administered manner.

Respondents were selected through a process of referrals, but this did not prevent problems of access. As a means of introduction, respondents were contacted directly by telephone, and offered the opportunity to participate in the research. In most cases respondents agreed to peruse the questionnaire and a short background information document before committing to participation. The background document provided a brief introduction to the risk society concept and the aim of the research. As part of the ethics process of the School of Geography, Archaeology and Environmental Studies, a consent form was also provided that introduced the author and emphasised that participation was voluntary, not binding on any respondent, and will not result in references to specific respondents in the final report. More than half chose not to participate further. The most common reason cited for not participating was time constraints, despite all efforts to accommodate respondents in the manner of involvement. Even the National Department of Environmental Affairs and Tourism, who is in

fact the authority responsible for the NCCRS, indicated that time and capacity constraints, as well as a high number of requests for participation in research make it difficult to commit time to this particular project. Without personal introductions by contacts or mutually known mediators, it appeared as if most respondents did not see the value in participating in research at this level or of this philosophical nature.

Fourteen respondents were originally identified as potential participants. This is not an exhaustive list of the possible range of respondents, but was deemed adequate for the level of investigation involved. It was also not anticipated that the response rate would be particularly poor. Of the fourteen, one was disregarded due to a limited involvement with, and knowledge of the NCCRS, and eventually only seven responses were obtained. This was not considered to be a fatal flaw in the research though, as the sectors represented by these responses offered a good cross section of stakeholders, and included national, provincial and local government, parastatals, academia and civil society.

In terms of the format of feedback, respondents were offered a choice between direct interviews, telephonic interviews or self-administered questionnaires. All three methods used the questionnaire that was used for the content review of the NCCRS. The questionnaire contains only open-ended questions, and since the responses were analysed afterward for content rather than in-depth insight, could therefore be self-administered or recorded during a structured interview. The direct interviews consequently kept strictly to the questions in the questionnaire in order to make a comparison between the responses from the various respondents possible. Direct interviews were requested by three government officials, with self-administration opted for by the other respondents. Informed consent was obtained where necessary. It was found that the direct interviews allowed some of the government respondents to voice concerns and opinions that were outside of the scope of the research. This might be indicative of the presence of significant personal drive to get climate change issues highlighted in more areas of debate, but inadequate opportunities or forums that offer the opportunity.

CHAPTER 5 FINDINGS: MODES OF REFLEXIVITY AND THE NATURE OF RISK PERCEPTION

Following the application of the conceptual climate change response framework (Chapter 3) to a real-world scenario (Chapter 4), the research can reflect on three aspects, namely:

- The application of the risk society concept to a developing nation's climate change response strategy
- The usefulness of the actual risk society framework and
- The insights it offers into the realities of risk response policy in modern risk societies.

The basic premise of the framework is that risk societies are born out of modern technological advances that create novel risks of global proportions. These risks are conceived in many different ways, due to the various influences that determine the public, scientific and political knowledge of the risks. The responses to the risks can then be formed either through an unaware or unintended reflex, or via a self-aware process that reflects on the risks and possible responses. The reflection may, however, lead to a self-critical response that does change the nature of the original risk, thereby simulating the unintended reflexive responses.

With the climate change response framework in mind, the analysis needs to use the NCCRS to engage on where risks and responses come from (i.e. the origin and nature of climate change risks), how they are conceived (manufactured and/or perceived), and how they are responded to (reflexive or reflecting responses).

Risk society in a developing country

The Origin and Nature of the Climate Change Risk

The first question to ask is whether the NCCRS engages the type of risk that Beck envisaged – i.e. modern, diffuse, and global. In this respect, the analysis finds that climate change is indeed viewed as a new modern risk by the NCCRS. One respondent was adamant that "*The whole point of the strategy is to avoid future damages and negative impacts, not respond only to short term tangible*

effects". Importantly though, the NCCRS does not identify specific causes or agents of change.

The NCCRS generally implicates modernisation as cause of the climate change risk through its complete reliance upon the findings and conclusions of work done for and in connection with the UNFCCC and IPCC. The strong indication from particularly the IPCC that modernisation is to blame for climate change is mirrored in the NCCRS's references and preoccupation with industrial development in South Africa, particularly mining and energy. Furthermore, specific discussion is allowed on South Africa's energy and carbon intense economy and emissions that will increase with further economic development.

By not identifying, however, particular lead causes or contributors to climate change risks, the strategy effectively steers away from specific response actions that would target these agents or sectors. Vagueness in the conception of the strategy therefore sets it up for further ambiguity in its recommendations since, effectively, nothing in particular is being addressed.

The strategy also does not hesitate to identify climate change as a risk of global proportions. Risks are described as global and universal, with local impacts inseparably linked to global aspects yet unique to each context. The local uniqueness is related to peculiarities of local energy use and modernisation pressures, but these cannot be delinked from the global problem, since local contributions add to a global energy and carbon wastage concern. In addition, the globalised nature of the issue is reflected in the strategy's strong reliance on global debate and response actions such as those promoted by or under the umbrellas of the UNFCCC, Kyoto Protocol and IPCC.

From the description of the nature of the issue, it becomes clear that the NCCRS concurs with similar international response strategies that climate change is considered a recent, global risk with diffuse origins and unintended consequences, as envisaged by Ulrich Beck. However, Beck's proof of the existence of a risk society, namely the uninsurability of modern risks, is not touched on by the NCCRS. The lack of references to insurance, however, does not exclude the possibility of the 'proof' applying to the South African case. Most impacts that are mentioned in the NCCRS such as agricultural production changes can only be insured on a seasonal or specific basis, but not in general.

Such specific insurance is not the same as insuring society against climatic change. The respondents concur with this finding, since in response to the question of whether the risks identified in the NCCRS can be insured, all respondents indicated that the general climate risks have no insurance, with only two respondents identifying the possibility of insuring specific end effects of climate change such as damage from extreme events.

Industrial Era Ideology

According to the risk society theory, industrial era ideology should progressively make way for individualised reflexive responses that respond unintentionally to risks (Beck, 1992). The review of the NCCRS therefore needs to indicate whether such ideological responses are still present, and if so, how they relate and compare to the reflexive responses. Since industrial ideology would be centred on class differentiation and comparisons of economic development measured against a Westernised ideal, references to these aspects may be considered as potential indicators of a non risk-aware society. It has to be questioned though whether any references that are present give rise to risk responses that apply industrial-era thinking in ways that extend beyond the norm, thereby changing the actual nature of climate change risks themselves.

As it turns out, references to the dichotomous system of world economic development are present in the NCCRS. There is for example the obvious reference to exploitation:

> *"The natural resources are in the poorer, developing countries, which are exploited by the richer developed countries" (South Africa, 2004,1).*

These ideological references are not obvious, however, since none of the respondents readily identifies any, although two respondents suspects that some ideology might feature as a small part of the strategy. Upon closer inspection of the NCCRS, one finds that global economic differences are mentioned, as are the differences between so-called developed and developing nations or regions. For instance, the first paragraph of the executive summary states:

> *"The developing world faces greater challenges than the developed world…" (South Africa, 2004, iii).*

The strategy actually has numerous references to the difference between 'developed' and 'developing' nations. These are linked to the ideology and concept of sustainable development, with particular comments about the historic, inequitable and unsustainable north/south divide of the world's economy and prosperity. In addition, climate change is blamed on the wealthy North, with the brunt of the impacts facing the poor South. The NCCRS is, however, not the only climate change related document that brings the concept of economic development into the debate. The recent IPCC summary document (IPCC, 2007) also refers to developmental differences and sustainable development as a conceptual solution.

The classical developmental references in the document therefore point towards a comprehension of society from an early modernisation perspective, as compared to a late modernity described by Beck (1992), and is further substantiated by the complete absence of references to a welfare state or risk society. Further, local economic realities are used in the NCCRS as drivers for the response, pulling the debate away from environmental issues towards economic developmental debates. This is particularly evident where the strategy compares the expected impacts from the Country Studies Program with the developmental principles and ideals of the region.

The immediate prospect of non-applicability of the risk society theory therefore arises. However, interesting aspects come to the fore when the developmental references are re-considered as particular parts of, or contributions to the risk society framework.

The manner, in which an ideology-based worldview could undermine a risk society-conceptualisation of the same, is through altering the perception of risk or preventing the perception from becoming risk-aware. A 'blame' allocation theory born out of economic inequality, for example, might prevent the further development of a climate change response to fully fledged mitigatory actions since the mitigation would be left to the countries who can afford it or who are perceived as having benefited from the actions that caused the current climate change risk. However, both the detailed review the NCCRS and the responses to

the questionnaire find that the references to economic dependency theory are mostly related to definitions or discussions of local economic vulnerabilities and opportunities. By implication, the description of economic realities therefore aids in the conceptualisation of climate change risk. It is consequently possible to consider such economic perspectives as an influence akin to scientific definition of climate change risks.

The implications of having alternative influences operate within the framework at such an early point in the generation of a response are significant. It implies that there is a possibility for multiple lines of progression from the generation of risks to the actual conceptualisation of response strategies. In this particular case, economic realities are employed to conceptualise and define the risks, but this means that economic development considerations can similarly generate contesting and self-critical expert opinions leading to differential arguments for and against certain response actions, and ultimately another influence in the political process of determining a response strategy.

Economic considerations will always form a very specific part of political negotiation processes. It is therefore an aspect that needs further investigation – whether the economic considerations used in the conceptualisation of risks are the same as the considerations that in part determine the outcome of the political wrangling that decides the response strategy.

In the NCCRS, a clear difference between the two is not evident. Whilst local risk conceptualisation is focussed mainly on local economic development issues, it also confirms sustainable development as a core principle of the response by referring to it on the first page of the summary. This implies that both short and long term response strategies are possible, since immediate socio-economic risks require short term solutions but sustainability a longer timeframe. It shows how development considerations are used to inform the determination of a response strategy on the one hand, but on the other hand also the ultimate decisions on specific response actions and regulation measures.

On the face of it therefore, it appears as if the conceptualisation of risks (related to economic vulnerability) are not materially different from the reflective process of determining how response actions will affect economic development.

The most important finding here is confirmation of Beck's stance that risk conceptualisation and early modernisation perspectives are not necessarily mutually exclusive. Both appear to have a contribution to the functioning of a risk society. It should be kept in mind though that a response that is not self-aware with regards to its ideological baggage, can be manipulated by it.

Conceived Reality and Manufactured Uncertainty

An aspect of risk societies that turns out to be central to the conceptualisation of a risk framework is the presence of manufactured (conceived) risk. Modern risks are 'manufactured' in the sense that they are known only through the information provided by expert systems, and not through actual experiential proof. By implication, it is necessary to consider two critical aspects of the risks in the NCCRS. Firstly, the information sources of the NCCRS must be evaluated, since they determine what is known as risks, and therefore whether a reflex or reflective approach is adopted. Secondly, the manner in which the information is reflected upon must be investigated, as the amount and nature of reflection determines the outcome of the response process – i.e. either as an accommodation of risk or a self-critical change to the risks.

The NCCRS confirms that risks are manufactured by relying on a local definition of the climate change risk based on impact projections of the Country Studies Program and the IPCC findings that extend fifty to a hundred years into the future, in order to inform and invoke change in the present. The respondents agree with the detailed document review that much of the NCCRS's risk perception is conceived rather than experienced. According to the respondents, the risks that are being responded to are *"possible future effects"* or *"market threats"*, and according to the strategy document, *"...possibly the greatest environmental challenge facing the world this century..."* (South Africa, 2004, iii).

In other words, despite this 'intangibility' of the risks, they are nevertheless considered very 'real', and demand responses in order to mitigate the threats posed to socio-economic well-being. The risk responses are therefore directed at 'manufactured' risks, since the respondents consider the possible climate change effects as future *economic* threats as opposed to directly experienced *biophysical* effects. This perspective reflects the general premise of the risk society theory that modern risks are the direct results of human ingenuity, but that they are only

known through means of scientific knowledge since they cannot actually be experienced on human scales of time and awareness.

This implies that the manufacturing of knowledge of risks relies on the application of expert systems which, in turn, represent a particular level of uncertainty that influences the origins of the strategy on the one hand and its effectiveness on the other. The use of expert systems during the conceptualisation of the NCCRS serves well to illustrate this vulnerability of risk societies, since this predisposes the strategy to unopposed content and recommendations. Even a DEAT representative acknowledges that some of the scales from which modelling results were drawn were inappropriate, yet there is no concrete initiative to revise, update and improve the strategy. The recollections of the respondents fail to identify any other specific references of the NCCRS other than the three commonly accepted ones – the Country Studies Program, Initial National Communication, IPCC Third Assessment Report. This leads to the respondents raising a concern that not enough local information, i.e. information related to current South African realities of socio-economic development, was used in the compilation of the strategy.

This shortcoming adds to a concern about the lack of a comparison of the datasets or opinions used as source documents. Such as comparison would have served to identify inconsistencies and update the information where the forced combination of scales and time sets required it. In particular, the NCCRS uses the Country Studies' information which in turn relies on a 50 year projection partially based on 1996 IPCC Second Assessment Report (SAR) data, and combines these projections with 2001 IPCC findings of the Third Assessment Report (TAR) in the NCCRS, various sectoral government initiatives, the prescribed Kyoto Protocol procedures and the summarised climate change situation report presented by the 2000 Initial National Communication to the UNFCCC. This results in the NCCRS acknowledging some real (or confidently expected) climatic changes, whilst at the same time mentioning the uncertainty about the scale and implication of climate change. It is a further admission that the risks are conceptual and uncertain since debate around the expected impacts means that we are conceptualising the risk, not experiencing it.

The research did indicate though that expert systems *per se* are not the problem, but rather the manner in which they are applied. As indicated, expert systems such as climate change science are essential in generating information and knowledge about risks and possible responses, and should therefore be present. The risk rather lies, on the one hand, in the unverified or unquestioned use of the knowledge they generate, and on the other, in the amount of uncertainty they can create. In the case of the NCCRS, the interview results indicated that there are some matters that fall outside the general scope of the NCCC that may benefit from expert contributions, such as macro-economic policy issues. However, in the absence of peer review, such fundamental contributions have the potential to determine both the perceptions of risk and the general nature of responses during the process of reflecting on risk.

Furthermore, the NCCRS fails to provide feedback loops that could prevent inaccurate or inadequate perceptions from being perpetuated. In particular, the strategy does not create opportunities for critical assessment of the base findings and the recommended actions that are taken up into the strategy. No effort is made to differentiate between risks or to identify acceptable limits of risk. Rather, legitimisation for any action is found in the general and widespread vulnerability that is identified. A reality is therefore constructed that advocates any response action, whether it is relevant and necessary or not. This could leave the response strategy or policy without the necessary direction to effect a change to the drivers of climate change risks; a result that is far from optimal in a modern context where risks need to be managed and fundamentally altered rather than simply avoided. By implication, a questioning of the information sources must form part of any future revision of the NCCRS, the envisaged sector-based strategies that should follow from the main response, or any similar risk response strategy, in order to evolve over time. This reflection on the strategy may (should) even extend as far as becoming reflexive, in the sense that the self-criticism draws into doubt the very origins of the strategy, and therefore also the process that brought about the reflection.

In addition to the above, it is noted that the NCCRS is in part based on reactions to secondary/indirect impacts such as responses to others' climate change response actions. Such secondary impacts are even further from a rational reality-based climate change awareness and rather reflect conceived responses

to perceived risks. The NCCRS therefore provides for a *tertiary* response to climate change risks. By implication, any inaccuracy in the base information or deductions would be systematically reinforced throughout the process of compiling a final response strategy.

Uncertainty and Contested Science

According to the Risk Response Framework, the process of conceptualising and generating a risk response strategy is fraught with all sorts of uncertainties such as contesting scientific opinions, imperfect communication, expert systems without peers and unchallenged systematic errors in both reflexive and reflective states. Uncertainty is, for instance, implicit in the NCCRS. In particular, the definition of risk and conceptualised impacts are very uncertain, especially due to the suspect data combinations.

The danger lies in the fact that these uncertainties can grow in the absence of any form of scientific or social self-criticism. This could result in a policy response that either defers action due to uncertainty, or promotes uncertain and ineffective responses as a result of over-sensitivity to external influences.

The first danger, the use of uncertainty to defer action, is addressed specifically in Article 3.3 of the UNFCCC which indicates that uncertainty should not preclude action (UNFCCC, 2006). Generally, but not completely, the NCCRS avoids this trap. Response actions are advocated even in the face of uncertainties related to the scientific understanding of climate change, the impact of climate change on the developing world and the specific impacts of climate change in South Africa. A wide range of possible adaption and mitigation strategies is considered, and action encouraged across the board. Beck's idea of organised irresponsibility is, however, present to defer action. Because no specific outcomes are envisaged by the NCCRS, a system of 'organized unaccountability' is created where stakeholders are not allocated particular responsibilities and response tasks, and effectively all response actions are legitimised by the uncertain standards and triggers for action. Ultimately, this reduces the effect of the strategy, especially with regards to reflexive changes that rely on intentional interventions that might not be fully aligned with the *status quo*.

In part though, the partial avoidance of the first uncertainty trap is driven by the second risk associated with uncertainty, namely uncertain and ineffective responses. In the absence of certainty, the NCCRS promotes any form of response action, as long as there is some level of developmental benefit associated with it. Potentially, this implies that the overall strategy is nothing more than a reaction to external pressures rather than a driver of considered and intentional change. The external influences could manifest in the form of foreign direct investment or local socio-economic development needs, leading to response strategies that fail to engage positive reflexive change, and therefore merely perpetuates the existing modernisation tract.

Uncertainty is therefore definitely present in the South African climate change risk response context. The following particular areas of uncertainty are identified in the NCCRS:

- *Systematic uncertainty*

The NCCRS is mostly descriptive, listing existing response strategies and programmes rather than critically evaluating and integrating them. As one respondent puts it: *"It is not a study, therefore does not contain all the 'proof' data"*. It does imply though that different datasets, time scales and assessment methods can be combined in the process, leaving any errors or shortcomings in the base data to represent built-in systematic uncertainty. The NCCRS, for example, acknowledges some systematic uncertainty in that it identifies local uncertainties in the Country Studies that result from the relatively course climate change modelling performed in the IPCC SAR, some remaining core climate change uncertainties such as the CO_2 fertiliser effect, as well as the global uncertainties of the IPCC TAR. Even a respondent from DEAT admitted that the strategy represents a first attempt at consolidating local research, and that it contains gaps in terms of local research and appropriate scales.

However, the strategy still uses findings from the Third Assessment Report in combination with the findings of the Initial Communication. The Initial Communication was based on the earlier work of the Country Studies reports which, in turn, are based on the IPCC Second Assessment Report (South Africa, 2000; South Africa, 2003; South Africa, 2004). The strategy therefore combines two instalments of the IPCC Assessments without questioning whether these

might have contesting findings or whether the older information would have an implication for any subsequent risk assessment work also used in the strategy. The science and recommendations of the SAR have therefore not been adapted or updated to reflect the TAR even though the updated TAR is used in the NCCRS. Uncertainty is therefore created at the very core of the NCCRS by using current knowledge and combining it with outdated vulnerability findings without verifying or re-evaluating the findings.

The respondents differed only slightly in their responses to a question on systematic uncertainty. Five respondents identified some uncertainty, a sixth found none, and the last respondent had no comment. It is therefore not a given that inherited uncertainty will always come to the fore without a specific investigation or targeted assessment. The uncertainties can therefore as easily be overlooked during use or review of the NCCRS.

- *Expert systems*

Expert systems are used extensively to inform the strategy. No other alternatives to the UNFCCC debate circles are used as key references, whilst neither the UNFCCC nor the related Country Studies are reviewed or critiqued. Industry specific expertise is also acknowledged in the main report where they are promoted as potential loci of self-regulation located within various institutions.

Otherwise, a number of the local stakeholders who are referenced as participants in the drafting of the strategy have narrow scopes in terms of their particular focus areas. There is also a heavy reliance on the various government and semi-government bodies represented on the National Committee for Climate Change. By implication, these participants can be experts at what they do and advise on, without the necessary peer review capacity existing internally or externally of the structures in which they operate. It also opens up the possibility that integration of various positions and information sets may not be a simple and accurate process. At the same time the close association with the National Department of Environmental Affairs and Tourism could imply the steering of debates in directions that are influenced by the political sphere.

One respondent raised an interesting point relating to expert systems, namely the absence of expert systems where they are in fact required. Despite the heavy

emphasis on economic risks and vulnerability, expert contributions from the financial sector (National Treasury and Department of Trade and Industry) is limited to an estimation of the cost of operationalising a central coordination function for the NCCRS as well as arguably popularist and unsubstantiated statements about unviable or prohibitively expensive response actions. Furthermore, despite acknowledgement that long-term climate change mitigation is a core requirement of a response strategy, the strategy fails to utilise its experts to engage on the macro-economic policy of the country. A case can therefore be made for more expert contributions on matters that fall outside the general scope of the National Committee on Climate Change (NCCC).

Undeniably though, expert opinions are used in the NCCRS without the means to peer review them. The result is a strategy that does not incorporate the means to differentiate between real and imagined risks, and therefore substantial and insubstantial climate risks.

- *Contested opinions, including reflexive questioning*

The presence of contesting opinions in a strategy would mean two things – uncertainty exists and is potentially being explored in a reflecting manner, and an opportunity is created for reflexive questioning of the strategy. Reflexive questioning would be considered by Beck to be part of 'reflecting' on risks, as opposed to an autonomous reflex reaction. However, it is potentially crucial for the development of risk responses, since the cyclical flow of reflexivity can take ever-changing individualised responses forward in order to change the nature of the development process. At a meta-level, therefore, reflexive response that results from reflection on risks and response strategies, can satisfy Beck's requirement for unintended and reflex-like response despite the reflection that determined the response.

Contesting views or inputs into the NCCRS were, however, limited, and consequently also the amount of reflection that is present. Although international climate change debates (IPCC) and differences in responses are mentioned In the NCCRS, alternative views are not considered. In fact, one respondent indicated that a particular weakness in the compilation of the strategy was the fact that so-called climate change dissidents were not involved. It is also noteworthy that many potential grass-roots level critics or contributors such as

the private sector, different tiers of government or non-governmental agencies appear largely absent from the response formulation process. The content review of the strategy indicates that the strategy was commissioned by the NCCC, and compiled by an external service provider. By implication, therefore, stakeholders had to have been part of the NCCC or alternatively part of the compilation process in order to contribute to the strategy in terms of content or critique. Participation in the NCCC is, however, reserved for major stakeholders and its operation as a committee would automatically reduce the influence of any dissenting view and consequently a balanced peer review. Furthermore, the composition and representation at the NCCC would remain within the control of the DEAT, further reducing the potential for inclusion of views that might differ from those in national government. This concern is emphasised in the comments received from the respondents, who freely identifies stakeholders that could provide valuable contributions such as civil society, the broader public, engineering sectors, financial sector, non-governmental organisations, local authorities, small businesses, *et cetera*. Two telling comments were also provided by the non-governmental sector in response to questions regarding involvement in the NCCRS:

> *"Response to comment was cosmetic." and*
>
> *"Seems a bit top heavy in terms of government inputs."*

The references provided in the strategy indicate that, with regards to participation and contribution during the compilation of the strategy, it did not draw on any information or expertise outside of national government initiatives. References to other stakeholders that do appear in the document relate to potential actions on their part to implement the strategy, and not to specific involvement in the drafting of the strategy.

The exclusion of non-NCCC representatives would have promoted a less contested view in the strategy formulation. Because uncertainty regarding information on available opportunities or non-negotiable action requirements dominates any possible uncertainty in baseline information, the absence of contesting views in general means that reflective development of the strategy is restricted since its fundamental components are never questioned. Hence, this 'shortcoming' of the strategy could explain its focus on maintaining the *status quo*

of the modernisation path of the country instead of questioning and reflexively changing its very nature.

The structure of the strategy also contributes to the unchallenged nature of its assumptions and recommendations. No uncertainties are acknowledged in the Executive Summary, other than a brief mention of the ongoing international debate relating to climate change. The summary is the section of the strategy that will be used most often because of its prominence and easier accessibility. Therefore, even though some uncertainties such as the potentially crucial integration of strategies and actual response action plans are discussed in the main strategy document, they will not receive the attention they might deserve.

According to the risk response framework, this limited reflection therefore leads to accommodation or redefinition of climate change risks, as opposed to change that will self-confrontationally change the drivers of the risks.

To an extent, the pursuance of the status quo suggests that symbolic politics might be present, i.e. more real intentions are hidden behind rhetoric. Symbolic politics can operate and provide a form of window dressing or greenwashing that relies on imperfect communication to hide true intentions. An argument can therefore be presented that the NCCRS, with its focus on the attraction of CDM investment and technological transfer, is merely a thinly disguised economic development strategy as opposed to an attempt to address climatic change. In support of this argument would be statements in the strategy document supporting the fact that the point of departure of the strategy is achievement of development objectives rather than a response to climate change, or the references to the rectification of global economic inequalities.

The mere avoidance of uncertainty, through limited opportunity or reflection, however, does not exclude uncertainty from the strategy completely. It is used to advance the idea that action plans for the strategy need to be further developed before any particular action can be implemented and also to postpone costly intervention such as changes that will affect the macro-economic context, or very long term mitigation. Even short term action plans are deferred due to the lack of information on specific economic opportunities. Again, this is typically what is envisaged by the response framework as ‘accommodation and redefinition’. The

risks of climate change are accommodated under the guise of insufficient proof of a threat, and therefore redefined as acceptable.

A question must be asked though – will a full-scale investigation into the elements that determine the macro-economic direction of the country lead to reflexive change and therefore significant response actions? Too much reflecting (investigation) certainly has the ability to incapacitate science, but at the same time could promote discourse that leads to reflexive change.

- *Imperfect communication*

The process of reflecting on risk is a sub-political negotiation that creates a response strategy from pre-existing scientific knowledge and risk perceptions. This 'ecological political economy', for lack of a better phrase, receives and processes information and knowledge and then distributes its findings and guidance. Consequently, it relies on communication of information and ideas, both in terms of the assembly of scientific knowledge and the dissemination of strategy. Uncertainty can therefore be created simply by imperfect communication.

Communication and the manipulation of information play a significant part in the politicising of risk in modern society. The advent of the global information society freed up the flow of information throughout the world, which left modern society with access to whatever information is preferred and with the freedom to apply the information at will. This freedom is a double-edged sword, however, since any form of control over information becomes an instrument of power. Since risk is a construct, the communication around risks becomes critical in determining the nature and extent of the identified threat, and consequently also the subsequent responses, as is the case with the stakeholder participation process of the NCCRS. The strategy was conceived, driven and ultimately approved by the NCCC, yet all the respondents found it possible to identify stakeholders that were not part of the formulation of the NCCRS.

Several mechanisms are at work when imperfect communication is put under scrutiny. To begin with, the base data or scientific findings might not be communicated well. The NCCRS, for example, acknowledges that better awareness of climate change impacts is required in government circles (South

Africa, 2004). This implies that climate change information might not have penetrated or were not communicated effectively outside of academic and scientific circles. In addition, the heavy reliance on individual strategies from government committees means that information is not used in a pure form since the NCCRS becomes little more than a reformulation of previously analysed information or knowledge. This is a definite form of information loss through imperfect communication, but also adds to systematic uncertainty.

The NCCRS is, however, not intended as a scientific reference document, and since not everyone has the necessary background to understand scientific language and concepts or the limitations inherent to scientific inquiry, some concepts have to be simplified. Manufactured modern risk, for example, doesn't communicate well outside of the climate change science fraternity or outside of academic language. Clearly, the availability of information (i.e. the existence of a strategy) is not a guarantee that the information will either reach its intended audience, or in fact be used to inform actions and decision-making. It should be noted though that not all the respondents concur that there is simplification of concepts in the NCCRS or that simplification is indeed negative. Responses to a question on whether catchy concepts are used in the strategy varied from *"much"* (academia) to *"nothing, possibly implicitly"* (government), whilst a respondent representing the NGO perspective accused the strategy of using simplification to skirt the difficult or contentious choices and decisions, yet another view from a governmental stance defended catchy concepts as simply making intuitive sense.

The media was mentioned by two respondents as a particular agent of communication relevant to the climate change debate. Media plays a significant role in the forming of opinions on a global level. It could lead public opinion, but also result in polarised opinions, which would lead to further debate and uncertainty. Mass media gained virtually unlimited access to people's perceptions of risk as a result of globalised communication networks. This pervasiveness, and the indisputable ability of the media to influence public opinion makes it a powerful tool in the hands of agents and structures that wish to shape public opinion in ways that would enhance their hold on social or political power. McCright and Dunlap (2003) demonstrates this well by showing how the use of mass media and specific information was used to promote specific political views

in the United States in order to steer climate change debates in a particular direction that suited groups with financial interests in non-renewable resources.

At the same end of the response communication process, simply poor communication would perpetuate the lack of climate change awareness, and prevent the response strategy from reaching all relevant stakeholders. This issue was raised by one respondent in a reference to the complexity of communicating climate change concepts in indigenous languages. Insufficient awareness would restrict criticism since potential critics might not be aware of the strategy, and various uncertainties would not be laid bare for questioning. In this regard, it is furthermore interesting to note that although the strategy calls for more awareness of climate change impacts, it does not actively promote any awareness of the NCCRS as the official national response to the risks. This inevitable limits the scope for criticism and hence reflecting on the response strategies.

Economic Policy

In the proposed risk response framework, political and economic considerations represent part of the link between knowledge of climate change risks and a strategy to respond to it. In a reflexive risk society, it would encourage reflexive change, and a reflecting 'risk' society, which prevents the automatic reflexivity from occurring. The presence of economics and politics in the NCCRS will therefore determine whether it represents a risk aware response as opposed to an unseen and unaware reflex reaction. It has the potential to also determine whether reflexivity will be present or not due to an influence on the perception of risk and judging of the appropriateness of responses. This investigation therefore also needs to understand how the dominant power systems in society use information, politics and law to reinforce their particular viewpoints and power structures.

From the outset, economic considerations are an integral part of the strategy. Respondents identified economic opportunities and threats as conceived risks, and the debate is obviously and intentionally pulled away from environmental issues towards economic developmental debates. This is evident in the NCCRS document through statements such as:

> *"…[since] climate change response actions can potentially act as a significant factor in boosting sustainable economic and social development, a national strategy specifically designed to bring this about is clearly in the national interest, supporting the major objectives of the government including poverty alleviation and the creation of jobs" (South Africa, 2004).*

This preoccupation with economics is further shown by the referenced sources and contributors that are predominantly focussed on the primary resource economic sectors rather than environmental agencies. In this regard, one can refer to the Acknowledgements and Bibliography of the NCCRS that focus on government departments and major stakeholders of the energy sector (The Department of Minerals and Energy, SASOL, ESKOM), with the balance of representation made up by academic or research institutions and only a single 'pure' environmental group (The Sustainable Energy and Climate Change Partnership). The problem that arises is that in the absence of certainty, economic considerations rather than climate science are allowed to determine the perceptions of risk and the limits of acceptable risk. The strategy can therefore take any substantiation in combination with, or instead of, environmental concerns to determine the type and nature of risk responses.

To an extent this turns the supposedly purely scientific and environmental field of climate change risk response into an economic and political ecology, since it directs action into areas where there is 'money to be made'. Many mechanisms are employed in order to reinforce the economic intentions behind the strategy. By focusing on specific information and sidelining contesting views, for example, the strategy may reinforce of its particular perspective. In particular, it is found that established global opinion, centralised around the IPCC and UNFCCC and informed by the Countries Studies reports, is used exclusively. This information is, however, not interpreted or evaluated in detail. The only mention of other opinions is the proviso in the summary regarding the ongoing international debate:

> *"Detailed action plans with defined time-scales will be formulated meaningfully on a case by case basis, in the context of the ever changing political backdrop to climate change, technological*

progress and the robustness of the assumptions about what can be expected to transpire from the international negotiation process, together with the relevant commitments that are likely to flow from them" (South Africa, 2004).

In the absence of any critical review, the only possible recommendation that can come from the strategy is to 'follow the current trend'. This recommendation is reinforced by the heavy reliance on established climate related government initiatives and debating groups. Although the strategy mentions a fair spread of different government advisory groups, other non-governmental advocacy groups are not fully included and might therefore have, currently, it would seem, to have very little influence in climate change developments. This is potentially very important since government committees are usually constituted on the basis of co-operation rather than scientific information sharing. By implication, any information will be toned down (or up) or counteracted by other perspectives without the benefit of rational scientific inquiry.

The global nature of the climate change debate also plays a role in determining the particular political and economic response. Economic development is a self-admitted goal for the strategy, and part of this pursuit is a readiness to latch onto economic opportunities presented by international climate change reaction, or in the words of one respondent: *"Local aspects [are] used to justify a free ride for SA"*. It can therefore be assumed that the driving factors behind international responses will be transferred into local reaction strategies, and that a need to participate and compete in a globalised system would play a role in determining national priorities.

The 'economy above all' strategy also finds support in the general absence of thresholds or limits of acceptable or tolerable risk. No mention is found in the NCCRS document of any specific regulatory actions, and the joint recollection of the respondents indicates that regulation was merely considered as a threat, and not a firm response action. Not having thresholds for acceptable climatic change means both unrestricted action and non-action and also means that the responses are based on opinion, rather than motivated actions. Legitimisation is therefore avoided, since none of the reaction strategies or actions can ever be

countered or supported by knowledge triggers. Apportion of blame and responsibility is similarly avoided.

Some perception-based legitimisation of the strategy is, however, achieved through the use of symbolic politics. Symbolic politics is present in the following:

- Economic aspects of the strategy weigh heavier than any other, and seem to prevent ecological or environmental concerns from taking the necessary limelight
- Uncertainty regarding the details is hidden behind the general call for reaction (adaptation). The actual actions are therefore not spelled out, just the proposals in general.
- Uncertainties are used as motivation for less pro-active mitigation.
- Catchphrases such as human development and sustainable development are used to substantiate the strategy
- The simplification and explanation provided in the main report is not taken through into the summary. The summary remains complex and without clear guidance on the real actions required. This takes a lot of sting out of the strategy, since its readers have to interrogate the strategy in more detail in order to get to the real suggestions.

As a consequence of the above, the strategy does seem to be a document that is an 'end in itself', rather than a plan of action with concrete recommendations for response actions. A more conclusive determination of whether the South African scenario represents a typical reflexive risk society response can, however, only follow once the presence of such reflexivity has been confirmed.

Reflexive Modernisation

If reflexivity is present in a risk society (general reflexivity, not only Beck's idea of a reflex reaction), then the causes of perceived risks would be altered through the further development of the same process that gave rise to the risks. Ideally, according to Beck, this has to occur without the influence of intentional self-confrontation that generates debate about risks and responses (Beck, 1992). If modernisation is to blame for climate risks, for example, more modernisation should be employed to alter the nature of the originally 'flawed' modernisation process. The outcome should therefore be a new manifestation of modernity that

prevents the originally perceived risks from becoming reality due to an 'over-application' of modernisation. By implication, if South Africa represents a risk society, reflexivity would manifest in the NCCRS as inevitable (unquestioned/uncritical) action plans to adapt the nature and possibly the direction of the modernisation process in an attempt to free the immediate socio-economic reality from the anticipated future risks.

This does appear, to some extent, to be the case in the NCCRS. First of all, the strategy recommends that South Africa adopt any climate change related initiatives that have demonstrated economic benefits - in other words further modernisation that fits the current modernisation process. These response actions, however, do not need to make any substantial difference to the nature of the modernisation process, and hence could easily represent the 'reflexivity by-pass' path of the reflecting scenario which directs action through accommodation and redefinition of the climate risks. This is certainly the feeling of the respondents, who indicate unanimously that the strategy encourages too little change to the development path. They also describe the changes that are likely as being too reactive and not sufficiently profound or systemic.

The possibility, however, remains that the response actions could bring about change in the modernisation process, whether incidental or intentional. The NCCRS, for example, indicates that climate change response will have incidental impacts on the nature of the modernisation process in the form of changes in the way South Africa consumes energy and releases carbon into the atmosphere. This is further evident in the description of the envisaged changes to the energy sector. The strategy acknowledges, and DEAT's response to the questionnaire confirms, that adaptation to climate change risks would have implications for the energy sector which is currently heavily reliant on coal-based generation, since most adaptation strategies would involve cleaner and more sustainable production and therefore also cleaner and more sustainable energy sources. Even response strategies such as technological transfer are intended primarily as a reduction in the local economic vulnerability of the current South African modernisation and development, yet unintentionally it will also address the global climate change problem, clearly initiating reflexive change.

The alternative to such incidental reflexive change would be direct, intended actions such as capped carbon dioxide emissions. The national response, however, does not extend this far, since it shies away from changing the macro economic development strategies of the country:

> *"To be successful, climate change action will eventually require a reversal of the global devaluation of natural resources, including energy. In this regard, a comprehensive national climate change strategy should ultimately address macro-economic considerations and not limit itself to a sector-by-sector approach. However, this is beyond the scope of the current document" (South Africa, 2004, 22).*

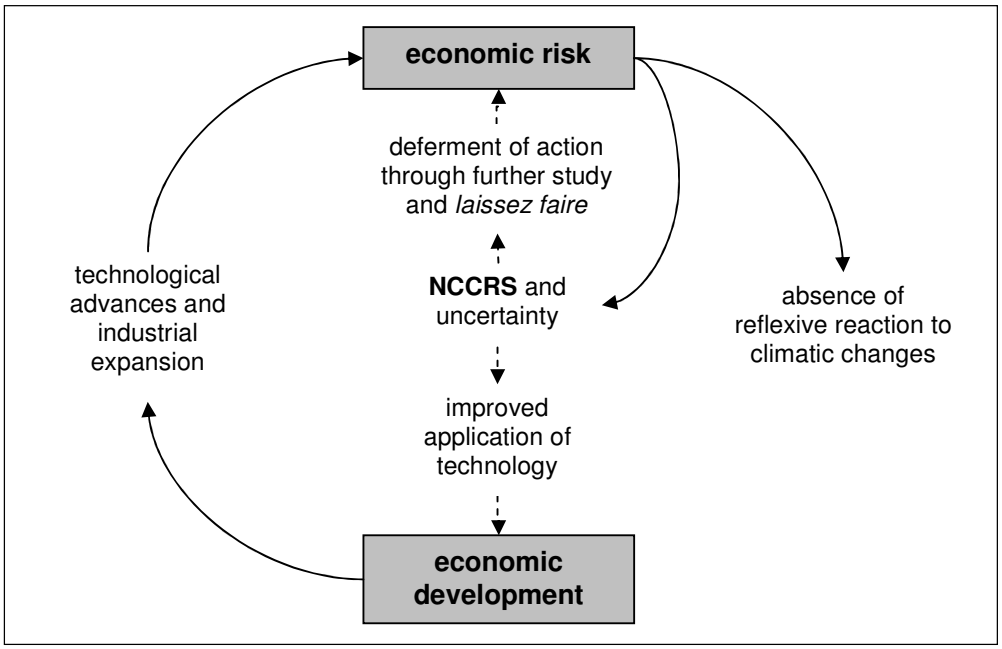


Figure 6: The NCCRS according to the risk response framework

In Figure 6 above, the NCCRS is depicted according to the envisaged risk response framework and to the preceding discussion. As can be seen, it does fit the model put forward by the framework as a response to climate change that is directed through the reflecting, or self-aware process, yet achieves partial (incidental) reflexive modernisation. The reflexivity is present in the adoption of response actions such as improved technology that follow from the reflection on climate risks. This stands in direct contrast to the accommodation and redefinition

that is present in the general 'everything goes' approach promoted by the strategy.

Modes of reflexivity

The idea of accidental or incidental reflexivity deserves a closer investigation, since it appears as if it is the only type of reflexive change that will result from the implementation of the NCCRS. It can also shed light on how Beck's idea of 'pure' reflex reaction should be compared to a reflexive response that results from a reflective self-confrontational pathway.

Most respondents felt that the strategy fails to engage the primary drivers of climate change risks, whether due to its structural limitations or South Africa's limited role in the global system, which clearly points toward indirect change being the only end product. The question to ask therefore is what determines whether direct or indirect reflexivity is pursued.

- *Manufactured risk*

Since the perception of risk is the foundation of risk responses, it should be considered whether the nature of the identified risks could be a major factor in determining how much, and what form of reflexivity is present in a response strategy. In the case of the NCCRS, the response is aimed at countering the economic impacts of climate change, in reaction to the outcomes of the Country Studies Program that highlighted the country's economic vulnerabilities at the time of writing of the Country Studies. The least costly means of achieving this aim would be a redefinition of the risks through adaptation, and hence limited reflexivity. If, on the other hand, the risk was defined as a biophysical risk, then the strategy would have had to engage on a reduction in the actual extent of climate change drivers and adaptation practices would not change the nature of the risks to biophysical threats. This link between the conception of risk and the resultant response was mentioned by a DEAT respondent, who indicated that the level of adaption action will be determined by the nature of the identified risks.

A graphical depiction that shows the different modes of reflexive change present in the NCCRS, linking them to the perceived economic risks, is presented in Figure 7. Economic development (modernisation), for example, which leads to

ecological impacts, and in turn economic impacts, is used as reference framework. In response to the economic impacts economic responses can affect the ecological impacts (incidental energy efficiency through adaptation) or the original economic drivers (reflexivity). Lastly, changes to the resultant economic impacts would also be possible through adaptation that relies on redefinition, and would represent the non-reflexive reaction.

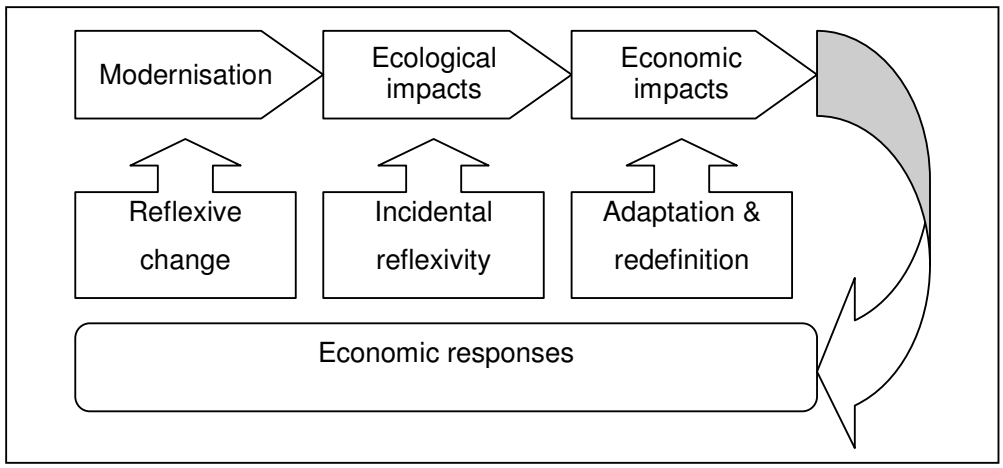


Figure 7: The modes of reflexive change present in the NCCRS

This analysis points toward the notion that non-reflexive responses could be attributed, in part, to the principles underlying the strategy. The NCCRS clearly states that addressing climate change is a secondary priority:

> *"…South Africa's position is to view climate change response as offering just one specific avenue of opportunity for achieving the sustainable development objectives of the national policies and legislation that are concerned with both development and environment issues" (South Africa, 2004, iii).*

This focus on development issues rather than climate change, coupled with the reluctance to engage the issue of direct and substantial intervention is important since, instead of modernisation solving climate change problems, the idea in the NCCRS seems to be that the climate change issue can solve, or at least assist in addressing modernisation problems. This becomes possible through piggy-backing development debates such as North to South technology transfers onto the climate change debate whilst the issue of addressing the core drivers of climatic change is obscured.

The strategy pursues responses that will limit the vulnerability of the country's economy, thereby protecting the *status quo* of the modernisation process. It is therefore possible that should the response strategy fail to find any response actions that bring about more modernisation, there would not be changes to the modernisation path and hence no reflexive change. The focus would remain on nationalistic adaptation measures with no pro-active intervention borne out of a more strategic global need for change.

This is certainly the feeling expressed by one respondent who referred to a *"…nationalistic approach to risks [with] some, very preliminary and roughshod adaptation"*. All respondents, however, refer to adaptation measures as opposed to simple redefinition of risks. It might indicate that the strategy does in fact advocate some action, but this could just as well be an indication of uncertainty being present, since it does not address the need for improved information and knowledge. Science in this context is therefore not reflexive.

- *External reflexivity*

Reflexivity could also be an externally driven process. The NCCRS will result in some measure of reflexive modernisation, but the changes will not be purely the result of a reflexive process in the local context, since many of the adaptations will result from international climate change responses such as an international need to offset carbon emissions. By implication, the reflexivity is inherited along with new technologies or practices and therefore external. Such externally driven reflexivity may not be sustainable in the long term. In the South African case, a large part of its reflexive modernisation would be a consequence of opportunism rather than a local longer term adaptation strategy, and hence could be reversed once the opportunity has been taken advantage of.

- *Institutional determinants*

This questioning around incidental reflexivity can be taken even further by asking whether it is possible to identify institutional aspects that determine when the simple, non-interventionist, alternative solutions are pursued and when full reflexive change.

The preceding analysis of the characteristics of risk societies pointed out how legislation, for a start, can be used to legitimise acceptable levels of pollution through legally determined thresholds or the allocation of shared responsibilities. Such legitimisation would allow for a reduced incentive for reflexivity in cases where the pollution is protected by law. However, the thresholds set by the legislation need to be informed by some process or knowledge base, and therefore a second, indirect influence could determine the amount of reflexivity. Potentially, this could be repeated at each juncture where a particular opinion or viewpoint is internalised in an administrative or political decision.

Imperfect communication can also play a part. The structure of the NCCRS reveals a contribution to the presence of differential reflexivity, with the summary that focuses on awareness of climate change, but the wording of the actual strategy text that promotes integrated solutions. In practice it is the summary and possibly the detailed recommendations from the strategy that will be used most often in decision-making whilst the main text of the strategy remains as occasional reference material. This implies that there will be a focus on creating awareness of the issue, rather than an active attempt at addressing the issues. Full reflexivity is therefore not yet reached, since operationally South Africa is more reflexive/progressive and willing to put in practice real innovative changes, but promotionally/strategically the country is reluctant to even use such language.

The drivers behind the policy could also be blamed for imposing structural limitations on the potential for reflexivity in scientific knowledge. Because of the preoccupation with support for existing economic development policies and government initiatives, the strategy never questions any of the initiatives and documents it draws together. Ogunseitan (2003) warns against such complacency, with specific reference to the Country Studies Program, since the unquestioning acceptance of the research framework could direct research efforts away from local priorities. As indicated previously, the combination of main NCCRS source documents does create information gaps and inconsistencies, which could be avoided through self-awareness at critical junctures.

This absence of critical questioning further means an acceptance of the correctness of the source data and therefore no reflexivity in the process of knowledge creation, since the *status quo* is merely perpetuated. It also points

towards the use of expert systems or the reinforcing of accepted or popular ideas rather than the unsanctioned questions and answers that might come from a more critical approach towards climate change impact assessments. The response therefore does not actively pursue better knowledge. Scientific progress will be used, where available, to direct specific actions whilst the general policy direction is made independent of scientific progress.

Even the future review of the strategy points towards a non-reflective nature – all respondents agree that there is no provision to review and improve the strategy and its foundations in future. It is noteworthy that this view is shared by a DEAT respondent despite an acknowledgement that the strategy is not perfect.

(Re)action strategies

- *Policy and Regulation*

Policy and regulation are the mechanisms that give structure and final direction to risk responses. They are therefore the last point at which it is determined whether, and how much reflexivity will be present in the overall response strategy. It therefore becomes necessary to understand how the interaction between the process of policy compilation, and the creation and implementation of a regulatory framework can influence the ultimate response.

As with the idea, that the definition of the identified risk can determine the level and nature of reflexivity that is present, so too is it necessary to question whether the nature of the regulatory framework in a risk response strategy can determine the amount of reflexive change. Such a wider scope will broaden the comprehension of the range of determinants of reflecting or reflexive change, and offer an improved understanding of the differences between the determinants.

As indicated previously in the discussion, regulation differs from policy in the sense that it represents an active attempt to manage and control the outcomes of a particular process or action, whereas policy merely describes the desired state. Policy would therefore overlap with regulation in the sense that it defines the subject of regulation, but will not extend to the active resolution or management of the risk situation. Although regulation is customarily nothing more than the enforcement of standards and thresholds advocated in policies, it can, however,

exist independently of policy as an unprincipled response – something akin to taking precautionary medicine 'just in case'. Both policy and regulation nonetheless need to control the presence and nature of response actions in order to ensure that the actions satisfy the objectives of the actors who originally required the change actions.

The NCCRS is very upfront about its basic approach of placing economic development at the forefront of any response decisions or actions. This policy direction can therefore be expected to guide any further response actions, whether through regulation or just a statement of intent. A DEAT respondent admits, however, to the fact that the NCCRS does not present a strong regulatory framework since it does not offer any standards, thresholds or quantified targets, merely the mention (threat) of possible regulation. Review of the strategy further indicates that the general vulnerability identified in the Country Studies Report is used to motivate for any type of response without any attempt to define acceptable thresholds of risk.

In summary therefore, the NCCRS has a strong policy position, but no regulatory structures, which leaves it at risk of being ineffective as a strategy to shape risk reduction approaches in the context of climate change.

Policy and regulation necessarily reflect some underlying determinations that result from the process of reflecting on risks. The entire regulatory framework is shaped by self-confrontational science, the ecological political economy, *et cetera*, since these would be the influences that determine the nature and content of policies. Regulation, on the other hand, has the freedom to use these considerations to determine where and how to exercise control. By implication, therefore, a regulatory framework can determine whether the objectives of a policy environment (whether reflexive or not) actually come to fruition or not.

In order to change from an 'early modernisation' (more of the same) response framework to a reflexive change to the drivers of climate change risks, regulation has to enhance the potential reflexive recommendations stemming from policy compilation processes. It is therefore important that the regulatory instruments originate from a perspective that understands and aims to achieve reflexivity. It might even be possible that a well conceived regulatory system could overcome or counter a policy that fails to address the need for reflexive change. However,

conversely, poorly conceived regulation or poor application can spell ruin to policy that directs action correctly.

When measuring the NCCRS against such considerations, it becomes evident that the document does not actively promote any regulatory frameworks, but offers a strong economic development policy foundation that can be used as reference for regulation. In spite of this, the possibility exists that there could be forms of external regulation inherited along with transferred technology and tools that follow from international climate response interaction.

An aspect of regulation that came to light during one of the interviews conducted for the research, for example, is that regulation also determines the amount of awareness in industry. This is due to the reluctance on the part of industries to effect change to their production processes, unless there are demonstrated economic benefits or legal requirements that forces change. Their awareness of the climate change response strategy would therefore automatically improve (albeit in a perverse manner) as the amount of regulation increases.

Also, because the strategy does not have a reference tool to evaluate the response actions that are recommended from the strategy's main sources, it becomes possible to recommend simple, non-interfering response actions that will address economic concerns rather than climate change risks. This is particularly evident in the fact that the custodian of the strategy, DEAT, was the only respondent to believe that the strategy will make a difference in the country's development path, despite expressing that it is merely *hoped* that further modernisation will be sustainable.

In order for response actions to make a meaningful difference, therefore, either thresholds that trigger response actions or specific objectives need to be set. The absence of such a system that distinguishes unacceptable risk and related regulatory procedures would probably reduce reflexive reaction to a minimum as a consequence of the natural tendency for the global free market system to resist costly change. It can consequently be questioned whether, as with the nature of the identified risks, the nature of the regulatory framework in a risk response strategy determines the amount of reflexive change that survives the self-confrontational reflective process centred found in the political, public and academic arenas.

- *Erosion of regulation and self-regulation*

Arguably, the greatest opportunity for development of the NCCRS lies in the absence of a system for regulation or structured control of response actions. This is a consequence of the fact that the strategy offers a strong policy position – a response to socio-economic risks – but weak mechanisms to ensure that the intended outcomes are achieved. The absence of clear regulation is potentially a reflection of the erosion of traditional regulation and concept of organised irresponsibility which Beck identified. Since the strategy does not actually set any targets or measures, no one will be held accountable or responsible for the outcomes (or lack thereof).

Risk societies would necessarily tend towards self- and transnational control and regulation in order to better match the globalised and diffuse nature of modern risks. In support of Beck's concept of liberation from national control and regulation through reflexive modernisation, the NCCRS shows how the politicising of risk, however, does not necessarily mean a further entrenchment of regulatory control. That traditional national regulation is steadily being eroded, in favour of supernational regulatory standards, is indicated by the near absence of references to local regulation in the NCCRS, as compared to the detailed contextualisation in terms of global programs of emissions control, regulation and trading. None of the respondents, for example, identified any regulatory measures or timeframes for action plans in the NCCRS either. Instead, global organisation and administration of climate change response strategies are used as references or programmes to be part of. Externally devised processes such as the UNFCCC and its CDM projects will merely transfer externally determined regulatory standards to the recipient location. South African reaction strategies for example are plugged into global debates and activities, despite the fact that the national response is primarily driven by local debates that do not have climate change as a core issue. By implication, the climate change risks are regulated through externally dictated or determined processes and standards. Regulation therefore becomes a 'secondary' reaction strategy, very similar to the incidental reflexivity identified earlier.

Notwithstanding an apparent reactive response, based on international climate change agendas, the strategy does acknowledge that expertise exists within both

government and industry. Regulation might not be proposed *per se*, but the strategy does indicate that some industries or sectors are, or need to become self-regulating. An example of a currently active self-regulation programme is found in the local reports compiled in support of the UK-based Carbon Disclosure Project (Carbon Disclosure Project, 2008). The acknowledgement of the need for industries to internalise a portion of their climate change responsibility implies that the strategy concedes that both normal regulation and self-regulation could be possible. The possibility therefore exists that the problem has become too big and complex for traditional regulatory practices. In the case of the Carbon Disclosure Project, one merely has to consider the global scale of operations of the largest carbon emitters in South Africa to realise that nation-state control has been eclipsed.

The development and use of different forms of regulation in a response strategy must be accompanied by an appropriate amount of circumspection though, as each form of regulation would have its own particular shortcomings. Traditional national regulation would be a simple start, but the strategy needs to ensure that the regulation is not used to legitimise unacceptable levels or forms of risk through legally determined thresholds or the allocation of shared responsibilities. On the other hand, self-regulation could represent a healthy form of reflexive regulation because it is self-critical, but at the same time it could represent a form of expert systems that would be beyond scrutiny. Lastly, transnational measures could offer opportunities for innovative global solutions, but as is evident in the current debates around international emissions reductions and trade, they could just as well mire down because of its scale.

- *Symbolic politics*

The strong non-climate change agenda put up as core policy underlying the strategy points to the fact that there are symbolic politics present in the strategy. This is evident in the manner in which the human forcing of climatic change is played down by the NCCRS, with only the consequent threat that climate change poses to sustainable development used as motivation for response actions.

Although the information found in the NCCRS's source documents uses likely physical climate impacts to inspire a call to adaptation actions, most of the impacts and response actions in the NCCRS are economic in nature rather than

holistically environmental. The strategy very directly links these impacts and responses to more certainty about the economic realities of the country and less certainty about possible climatic changes. One respondent remarked, for example, that climate change and immediate human needs issues are competing for the same budget, which is a view that results directly from uncertainty around sustainable development. The strategy therefore uses the popularised concept of 'sustainable development' as symbolic of any socio-economic debate to motivate for action. Certainty about related aspects may therefore inspire more response than certainty or uncertainty about the main physical threat of climate change and the fact that human action is to blame for the situation. This is a typical example of how reaction (local response to real effects) will always overshadow prevention (strategic global intervention).

The structure of the strategy is also arranged in a manner that non-action is protected. The main report indicates that further information and opportunities need to inform the response actions, and hence it only recommends continued monitoring. In contrast, the quick-reference summary advises immediate action, creating the impression that the strategy advises strong intervention.

Manifestations of Risk Responses and Reflexivity

By stepping back from the detailed analysis for a moment, it is possible to lastly, and briefly, reflect on two general aspects of responses to risk – the uncertainty inherent to risk perception, as well as the manner in which ideological politics determine responses.

Manufactured Risk

The uncertainty inherent to all aspects of modern risk societies implies that particular forms of self-awareness and management are required as controls, in order to inform, rather than hinder reflexive progress – even if it extends to 'reflection' more than 'reflexivity'. Any climate change response consequently needs to be aware of the uncertainties that informed it, yet respond in accordance with the magnitude of the likely risks. This becomes possible in a risk society since it is the very uncertainty that frees the components of modern societies such as the public sphere, politics and law from the absolutes of science. Although, in the case of the NCCRS, the natural sciences are used to

inform the overall strategy, the scientific findings are not alone in determining the recommended responses. Other influences such as politics (North-South developmental issues) and economics (poverty and unemployment) contribute to turn the uncertainty around impacts and vulnerability into response strategies. The combination of uncertainty and self-reflecting questioning implies that we need not accept blindly what is said by the scientists/experts/media, but rather democratically determine which or how much risk (or uncertainty) we are willing to accept. The response strategies of the NCCRS consequently allow society to determine whether the risk is directly related to climate change or rather economic considerations, and therefore which response actions are preferred.

With all this in mind, it becomes crucial to remember who and what contributes to the manufacturing of risk, since the originators have different priorities, perspectives and agendas that might or might not require a change in the way we conceive or create risks. Similarly, a close watch over the drivers behind response policies is warranted, since the constructing of risk perceptions determines the pattern of reflexive questioning and nature of the response strategies.

Politicising Risk

Given that the conceptualisation of risk can take place in many different contexts, and is not shaped purely by the presence of expert scientific contributions but also political and subpolitical influences, it stands to reason that not all perceptions of the same risks would be identical. The research indicates that such differences in the nature of risk perception have direct bearing on the resulting response strategies. This is evident from the correlation between the economic vulnerability risks and socio-economic developmental responses that are prevalent in the NCCRS, as opposed to risks and response actions purely related to biophysical aspects. Amongst other things, therefore, risk responses need to be conscious of the manner in which the presence of politics and subpolitics affects risk perceptions and consequent response strategies.

The NCCRS is an initiative driven by a central government committee, and is therefore very closely related to mainstream political direction – as is likely shown by its '*status quo'* recommendations. However, as is indicated by discussion earlier in this report, political decisions need to satisfy both economic interest and

democratic opinion in order to maintain control over power structures. These two, economic drivers and public opinion, are the spheres in which subpolitical influences can operate alongside traditional politics to determine risk responses. Various mechanisms will be present – the focus on economic costs and benefits, legitimisation of risk, manipulation of information communication in the media, *etc*. The challenge is to identify these influences and understand their influence on opportunities for reflexive change, potentially incorporating them as part of a process of reflexive criticism.

The presence of industrial era ideology in the NCCRS is an example of how the supposedly natural science concept of climate change is being politicised as a political ecology. However, it also raises a question regarding the use of politics in risk societies. In Beck's conceptual risk society, modernisation should evolve to a new level of decision-making freedom where ideology does not get a chance to manifest. Ideological politics should therefore be the medium through which risks are traded and responded to, but not the determinant of the responses. In practice though, and with specific reference to South Africa, early modernisation thinking appears to be the main form of risk politicising, and therefore intentionally or unintentionally, both the medium and main driver of the reflexive modernisation that is present. By implication, therefore, Beck's idealistic concept of a risk society that is freed from ideology appears to be just that – an ideal.

Chapter 5 delved deeper into the character of the South African climate change response, as brought to the fore by the risk response framework. A thread is identified that runs from the conceptualisation of risk, and the uncertainty that it creates, all the way through to the eventual response direction and actions, which has the potential to affect the very nature of the response. It determines how self-critical the response is, how it deals with the various forms of political influence, how it gets communicated and ultimately whether it will effect real reflexive change to climate change drivers. In the case of the NCCRS, the thread starts with economic drivers, and results in incidental impacts on climate change risks. Chapter 6 reflects on the implications of risk responses that are restricted to incidental reflexivity for both philosophical and practical contexts.

CHAPTER 6 FINDINGS: THE CLIMATE CHANGE RESPONSE FRAMEWORK IN ACTION

In this penultimate chapter, the research reflects on the original questions posed:

1) Whether the risk society theory offers a framework to which risk responses conform;
2) To what extent the South African Climate Change strategy available at the time of writing this report fits the description of a risk response; and
3) Whether aspects of the risk society framework might limit, or provide further direction to climate change responses.

The research presented a conceptual framework of typical risk-based responses, and used it as reference for the assessment of a climate change response policy. Various aspects of general risk society theory were scrutinised, and various structural components of the theory identified that have a direct bearing on the nature of the risk responses. It also allowed the selected aspects to be applied in a practical context in order to identify further peculiarities associated with the risk society theory in a real-world scenario. Examination at both levels, theory and practical application, enabled the identification of aspects inherent to risk response in modern societies. The findings from this research will hopefully begin to augment knowledge of risk society theory as well as risk response policy work. During this process, some of the criticism of Beck's theories is also addressed by the application of the concept to a real case study.

The following overview consequently summarises the findings of the study, and engages on some of the critique levelled at Beck, as identified in Chapter 2.

The Climate Change Risk Response Framework

In order to better conceptualise Beck's theory of risk societies, the key aspects of his theory, namely modernisation and risk, were assembled in a simple flow diagram (Chapter 3, Figure 4) showing how each component drives or influences the other in a circular flow of causal reactions. The diagram makes it obvious that reflexive responses to modern risks can, or at least should ultimately, alter the original drivers of the risks, a process described by Beck as reflexive

modernisation, which may lead to a new state of 'cosmopolitan' existence (Beck, 2004).

Societies do not, however, simply become reflexive overnight. Some degree of accommodation and redefinition of risk, as opposed to reflexive adjustment of the risks, is likely to remain. It is, therefore, unlikely that they will completely transform into perfect risk societies, on all levels. An in-depth analysis of the various primary constituents, key concepts, interrelationships and cyclical processes inherent to the risk society theory were used to add a reflexivity by-pass alternative to the original flow diagram as a more realistic representation of modern risk societies. This scenario is presented as Figure 5 in Chapter 3, and it gives structure to the difference that Beck identifies between reflex and reflection. Reflection becomes a self-conscious questioning of risk and risk response context as opposed to an autonomous reflex reaction.

The research was, however, intended to focus on the responses that follow from modern risks, and not the theory of risk societies as a whole. Consequently, the 'reflection' box present in Figure 5 was expanded further in order to identify the various influences and processes that contribute to the conceptualisation of climate change responses. The suitability of the framework was checked by applying it to a real-world scenario, in this case the South African climate change response that was available at the time of writing this report, with the intention to confirm its validity as reference tool.

As is shown here, the framework provides insight into the dynamics of risk societies and their potential for self-confrontational and reflexive change, as proposed by Beck and Giddens. Three broad categories of dynamic processes inherent to modern risk societies were identified in this research, namely *manufactured risk, political economies and response policies*. In combination with the assessment of the NCCRS, however, the framework also provided further insight into the manifestation of the risk society theory in the modern world by characterising the nature of risk responses and reflexivity in a developing economy. This successful application of the framework indicates that it has definite potential as a tool for analysis, and as a reference for the understanding of responses to risk in modern societies.

Risk Responses and Modes of Reflexivity

According to Beck (1992), the functioning of modern societies is not focussed on trading in resources, but rather on the trade in risk. Specifically, responses to modern risks would be mindful that climate change risks cannot be avoided, and therefore the trading in risks offers the opportunity to weaken or change the drivers of global warming and climatic change through reflexive modernisation.

In reality though, the research indicates that, despite all the conditions being present for a risk society, the intention of the NCCRS is to maintain the current conditions of development as opposed to attempts at changing the drivers of climate change risks. This is shown by the intention of the NCCRS to use the climate change debate as vehicle for the attraction of foreign investment and technologies as adaptation strategies in order to satisfy short-term developmental risks and needs. It is also echoed by the nearly unanimous agreement from the respondents that the NCCRS will not change the South African modernisation process. In terms of risk responses and reflexive change, therefore, the NCCRS does not envision, or drive a reflexive change towards a new state of risks.

A very important finding though is that it does not, however, mean that reflexivity will not be present. By comparing the NCCRS to the typical risk response framework, it is found that there are different modes of reflexivity that could be present in any risk response. In particular, the NCCRS exhibits an external, secondary and incidental reflexivity, as opposed to reflexive change that should be internal or a reflective change that would be intentional.

Incidental reflexivity refers to reflexive change that occurs as a secondary effect of other responses or interventions. In the South African case, the reflexivity results because of the transfer of external standards and knowledge, and not because of a primary process of affecting the drivers of climate risks, hence it being ‘incidental’ rather than ‘internal’. Reflexivity is therefore externally driven rather than a direct result of an internal process of review and adjustment. It also does not satisfy Giddens’ definition of reflexivity which Beck calls ‘reflection’, that envisages an intentional and self-aware process of self-confrontation as it embraces any handout without much critical assessment.

The different modes of reflexivity appear to be determined by various systematic or institutional determinants. From the NCCRS, it appears that the reflexivity could be determined by the nature of the risk that is identified and responded to. Despite climate change being a global issue, the South African response focuses on the local economic risks posed by climate change and, since these are quite pressing, also directs immediate adaptation in the direction of economic development opportunities. As a consequence, long-term mitigation receives less attention, and therefore does not contribute to a reflexive change of the drivers of the climate change risk.

This finding links to the fact that risk conceptualisation and early modernisation perspectives are not necessarily mutually exclusive. As Beck indicated, reflexive responses and reflecting debate can occur simultaneously, as part of the same risk society. Indeed, both appear to have a contribution to the functioning of a risk society in South Africa. This is evident because the main driver for the South African climate change risk response is the risks posed to the local need for socio-economic modernisation within a developing economy. In addition, the strategy recommends responses that will rely on more modernisation, but at the same time involve a level of reflexive change to the nature of the modernisation.

Implications for Science

Giving structure to risk responses

- *Risk response frameworks*

The framework of risk response formulation which is used to analyse the NCCRS is one of the primary contributions of this research report. The framework gives structure to the policy formulation process, which alleviates to an extent the concern expressed by Bulkeley (2001) that it is not easy to do systematic analyses of (and *with*) Beck's work.

In this particular research setting, the detailed framework is used as a systematic evaluation of the South African National Climate Change Response Strategy. This serves the joint purpose of testing the applicability and accuracy of the framework, and assessing the NCCRS from a risk society perspective. In both instances, the framework provided satisfactory results, as indicated in more detail

in Chapter 5 of this report. The wider application and testing of the framework is therefore encouraged.

- *Reflexivity by-pass scenario*

A particularly important aspect illustrated in the response framework is the presence of responses to risk that do not contribute to reflexive change in modern risk societies. Whereas the risk society theory envisages that risk responses should bring about unseen and unintended changes to the nature of the risks that are responded to, the research proves how easy it is for non-reflexive responses to exist within risk societies. In the case of the NCCRS, for example, the strategy fails to trigger any specific response actions that aim to affect the drivers of climatic change. Instead, the strategy merely suggests various possible response actions that share the central aim of using adaptation to reduce vulnerabilities.

The identification of the reflexivity by-pass within risk responses makes it possible to further investigate how risk responses are generated, why reflexivity is avoided, where reflection fits in and ultimately also what it means for the need to achieve reflexivity in modernisation.

Modes of reflexivity

- *Internal versus external reflexivity*

When modernisation is pursued through means of reflection (i.e. by making it the topic of discussion in science, politics and public debate), the progress runs a higher risk of merely perpetuating a *status quo* which fails to alter the fundamental drivers of the risks posed by climatic changes. The investigation into the nature of reflection, however, indicates that direct reflex is not a prerequisite for reflexivity. Instead, incidental or secondary reflexive change can be present, albeit with far less overall effect on the extent of the risk. In the South African case study, the NCCRS exhibits no intention to achieve any reflexivity, yet some of its recommended response actions will necessarily change the nature of the country's contribution to climate change. These secondary effects will result from the adaptation to external opportunities for technological transfer and Clean Development Mechanism implementation projects that have actual effects on the

drivers of climate change. In the research, this is termed 'incidental reflexivity', and it generally describes reflexivity that is external or secondary.

This concept of incidental reflexivity points to a particular failing of modern risk societies, also identified by Bulkeley (2001) and Demeritt (2001), namely that reflexivity is yet to achieve Beck's envisaged state of utopian reflexive modernisation. Instead of having a society with sufficient freedom to unintentionally and automatically steer risk responses towards reflexive modernisation, examples are provided of risk response scenarios where changes to the modernisation path are dependent on 'accidental' reflexivity. Further debate and application around the concept of reflexive modernisation and risk societies would have to consider this fact closely, in order to understand the limitations that it places on the developmental progress of modern society.

Another critical question to be asked in order to take this line of investigation forward, is whether or not incidental reflexivity satisfies Beck's definition of reflexive modernisation as being unintended reflex reaction.

- *Determinants of reflexivity*

From the research it appears as if two aspects in particular, namely risk perception and thresholds of significant risk, are critical determinants of the amount and nature of reflexivity that is present in risk societies.

In the first instance, it was evident in the analysis of the NCCRS that a socio-economic risk focus led to recommended response strategies that addressed socio-economic development, as opposed to climate change mitigation. The nature of the perceived risk therefore determined the process of response formulation and therefore also the amount and nature of reflexive change. This is a finding that will be not only be relevant to assessments of climate change responses, but to all risk responses. It reflects what Murgida and Gonzáles (2005) experienced in South America, Horlick-Jones (1995) in some westernised megacities (London, New York and Los Angeles), and Adger (2006) in general – that the nature of risk perception is central to the determination of responses, and that the risk perception is in turn determined by the various political and subpolitical influences that make up the social context. The research also

addresses to some extent the concerns expressed by Lacy (2002) that Beck's analysis lacks a broader discussion of risk construction.

The identification of risk perception as a critical factor adds a specific dimension to research in the field of risk responses though, by highlighting how crucial local definitions of risks are. Response strategies and actions should therefore not be considered in isolation from the risk perceptions that they address.

The second aspect, the indeterminate thresholds of significant, tolerable or acceptable risk, has important implications for reflexive change. Without a definition for the limits of acceptable risk, either no responses, or responses that have little or no impact on the nature of the modernisation process and drivers of climate change become likely. This results from the ability to legitimise any response action that has some form of tie to the identified risk, as opposed to actions that have targets to reach or specific risk drivers to affect. Inevitably, this will affect the balance between adaptation and mitigation strategies. In this respect, the research echoes the findings by Dessai *et al.* (2004) that it is crucial to define locally relevant definitions and thresholds of danger if robust response policies are to be pursued.

Constructivism

- *Perception of risk*

An important theme that is identified in the research, and which is common in all scientific fields related to risk responses, is the realisation that perceptions shape responses to risks (Dessai *et al*., 2004; Adger, 2006). Bulkeley (2001) notes that Beck's thesis on risk society identifies a cultural and institutional context that contributes to the construction of contemporary environmental risks, whilst Lacy (2002) points to the failure to fully address risk-construction as a shortcoming of Beck's work. The risk society-based evaluation of the South African climate change response strategy confirms these findings, by pointing out how early modernisation ideology, and specifically economic dependency theory is used alongside the natural sciences to define climate change risks.

The problem faced by the sciences is firstly how to define, and secondly, how to deal with the uncertainty that is highlighted by this focus on perceptive variance.

In both respects the proposed risk response framework can prove useful since it offers an assessment tool that gives structure and definition to the reflective path that determines risk perception as opposed to the un-aware reflexive response conceived by Beck. Once the various influences that shape reflection are known, they can be evaluated further to determine their respective contributions to the risk conceptualisation.

In the case of climate change risks, for example, industrial era ideology can potentially be identified as an influence on risk perception. The influence can then be critiqued, in order to improve the relevance of the risk concept and match the response strategies better to the conceived risk.

- *Influences on the response creation process*

The analysis further points out that the very same aspects that determine risk perceptions shape the entire policy formulation process that lead to the actual risk responses. Factors include globalisation, manufactured risk and uncertainty, scientific debate, formal and informal politics, and the various forms of regulation. The identification of these factors through means of the application of the risk framework allows for a critical look at the various factors, and hence an understanding of their roles in determining the nature of the end product.

One of the issues that came through strongly in the research is the politicising of ecology and environmental risks through ideological determination or socio-economic development perspectives. This is not unlike the findings by Pielke Jr. (2005) who finds a similar determination in the international definitions of climate change, and the work by Klein *et al.* (2005) that describes a strong link between development issues and climate change responses. This research in fact adds further questions to the list posed by Klein *et al.* (2005) querying the nature of effective and efficient climate policies. More examples of research in this respect are found in the work by Christiansen (2003) and Jacobsson and Lauber (2006).

The research has shown that in the South African scenario, concerns about socio-economic welfare, and some influences from industrial era ideology or dependency theory, override any ecological concerns in determining climate change risk responses. The fear that economic interests could be shaping socially-constructed values for use in environmental policy is identified by

McGonicle (1999), and interventions recommended in order to steer economic development on a more sustainable path. The NCCRS, unfortunately, adopts an approach that will accommodate any form of response action that supports the course of economic development. It must therefore be considered how this political *economy* can be redirected and turned into a political *ecology* instead. A more ecological approach would possibly focus more on issues such as sustainability in resource use, and hence change the nature of risk perception and the formulation of responses to the risks. It will also allow a more prominent position to the resilience school of thought that balances socio-economic welfare firmly on top of a healthy or stable natural resource base.

The creation of risk perceptions and risk responses necessarily also has to rely on expert systems as a consequence of the conceptual nature of modern risk manifestations. Specialist inputs are required to describe risks, their impact and their causes. As shown by the risk response framework though, scientific information can be subject to self-criticism, manipulation for political or subpolitical gain, distortion through poor communication, and ultimately selective application before it is taken up in risk response strategies. This mirrors the need for a thorough understanding of the web of science-practice interactions, as identified by Vogel *et al*. (2007), as well as a critical appraisal of knowledge construction and its use in policy formulation identified in Beck's work by Demeritt (2001, 328):

> *"For Beck...the prospect of sweeping public scrutiny of science represents the final achievement of the Enlightenment's emancipatory potential."*

The inherent problems of using expert systems in the process of knowledge creation are also identified by Munnichs (2004), as are the concerns regarding the interplay between science and uncertainty by Demeritt (2001). These concerns are valid in the case of the NCCRS, as the research points out how source documents are used without question, despite the risk of culturing systematic uncertainties. Weiss (2002) responds to these fears by calling for more self-awareness on the side of the scientific community in order to overcome the shortcomings inherent to the communication of technical or scientific information to non-experts (see also Patt and Dessai, 2005), and the research

finds that this can also be extended to elementary aspects of policy formulation such as a neglect of awareness strategies or language barriers.

In a way, however, Beck was correct in advancing the idea that reflective questioning can act as a countermeasure. Self-confrontation and criticism of expert scientific perspectives should lead to better, or at least more representative science, and potentially, could even form the basis for dialogue between the diverse perspectives and policies such as the adaptation versus mitigation debate which Tompkins and Adger (2005) describes. The proposed risk response framework can aid in this process, by providing a reference that can be used to identify junctures in the policy formulation process where self-awareness should be employed to stimulate questioning of expert systems or communication failures.

Relevance in the Third World

The case study shows that the politicising of risks has implications for studies of vulnerability, adaptive and mitigative capacity, and resilience, since it results in response strategies that tend towards short-term adaptation tendencies to better match the urgency of basic human needs as opposed to longer term mitigation actions. Although, in itself, the research does not advise on which response strategies are preferred, it does offer a tool that can be used to systematically evaluate the origins and expected outcomes of various strategic response directions, and therefore their relevance to particular contexts – a need identified by Klein *et al.* (2005).

What has not been investigated though is whether non-, or partially reflexive reaction is in fact undesirable. The South African response is far from fully reflexive, as it advocates adaptation only to the point where reflexivity becomes incidental, but this could in fact be the correct approach for a local scenario contextualised by development needs and global disadvantages. This stands in stark contrast to the iterative process employed in the case of the IPCC Assessments. Siebenhüner (2002) describes how organisational learning and reflective mechanisms helped shape the Third Assessment Report. Interestingly, it does mirror the Fourth Assessment Report (IPCC, 2008) that admits to a far more extensive reflective process that allows for all the linkages between climate change drivers, risks, impacts and vulnerabilities and socio-economic

development to be assessed, thereby acknowledging that any responses to climate change risks will have reflexive consequences for the nature and drivers of the risks.

In summary therefore, the research report adds value to the existing scientific debate regarding reflexivity in science, and in particular the process of policy formulation, by highlighting critical elements in the South African climate change risk response context. Similar analyses in different contexts will refine the proposed risk response framework further, or at least provide a better understanding of its usefulness as a tool for systematic analysis of real-world risk societies. Differentiated application would also provide insights into the differences between various manifestations of Beck's risk society. As an initial suggestion, a similar analysis of the IPCC Fourth Assessment Report is recommended. Such an analysis would compare the reflexivity inherent in international climate change science to local or regional examples, thereby pointing out potential weaknesses in risk conceptualisation related to the developing world.

Implications for climate change response strategies or policies

Self-awareness/reflexive self-assessment

Probably the strongest message for risk responses that is communicated by this research report is the central role played by self-awareness. The presence of reflective criticism during the conceptualisation of the response will ensure a comprehension of the nature of the risk perceptions informing the response, whereas a critical stance during the policy formulation phase would do the same for the political and subpolitical influences. The objective would ultimately be to enhance or neutralise the influences, depending on whether they support or counteract the targets set for the response strategy/policy. In this respect, the proposed risk response framework, or similar analytical tools, should be used to identify the various elements and relationships that contribute to the response formulation process.

It would, for example, be useful to apply a risk society perspective during the compilation stage of any new climate change response strategy, in order to identify, and where required neutralise, some of the industrial era references that

could affect the self-confrontation or overall reflexivity that results from the implementation of the strategy.

The use of expert systems is an aspect of risk societies that is closely related to the issue of risk perception. Experts have to be consulted as part of the comprehension of climate change risks, but it is possible for their unchallenged sovereignty to have drastic implications for risk perceptions and response strategies. Response strategies therefore need to take cognisance of the sources of information, the availability of peer review mechanisms as well as the limitations posed by the communication of information. Such questioning would constitute a form of reflective scientific inquiring that can aid in drawing many different pools of thought together, or simply to get to the essence of a particular perspective.

A last aspect that needs close self-scrutiny relates to communication issues, as pitfalls abound when people are not relying on first-hand information. The summary section of a long report will necessarily contain less detail than the main body of the report, but that creates an ideal opportunity for critical bits of information or context to be 'lost' once main text items are taken up in the summary. By implication, self critical awareness needs to ensure that the structure of a document does not influence its content and objectives.

Similarly, care must be taken to avoid symbolic politics from diluting or distorting the information being presented in response strategies. Contentious or uncertain terminology such as 'sustainable development' must be identified and relevant definitions decided on in order to prevent the uncertainties from finding their way into response strategies.

Measures of effect

Performance standards for climate change responses can only exist if thresholds are provided either as limits of acceptable risk, or alternatively as measurable goals. As one respondent indicated:

> *"If you know how immediate and big a risk is, then you can decide on reaction."*

The NCCRS proves that the absence of thresholds creates uncertainty in terms of which risks are being responded to, which response actions are critical, what types and levels of effects are desired and how much change to the drivers of climate change must be pursued. A lack of thresholds will be even more crucial in cases where the strategy needs to inform regulatory processes. If no reference framework exist, then the measurement of performance becomes impossible, and a system where no-one in particular is responsible for the response actions (organised irresponsibility) takes control. The absence of thresholds also has impacts on which response actions are considered legitimate, since there would not be a yardstick for the evaluation of different responses. Response action could therefore easily by-pass the reflexivity required for fundamental changes to the original drivers of the risks. Such a system must therefore be actively avoided in similar strategies or future revisions of the NCCRS.

Even though it sounds like an obvious statement, the research indicates that risk responses would be 'risk specific'. In other words, the perception of risk determines the nature of the responses, and therefore also their effectiveness. In the case of the NCCRS, the definition of risk as socio-economic in nature has a major influence on the recommendations regarding response actions, since they too become focussed on immediate socio-economic considerations. The danger lies in the fact that despite the socio-economic focus, the response actions are not guaranteed to have any significant impact on the scale of climate change in general, and hence could imply a failure to achieve sustainability in the developmental drive.

CHAPTER 7 CONCLUSION

From the investigation into the NCCRS, therefore, it becomes evident that in a highly diversified and heterogeneous world, the presence of a society that responds completely reflexively to risk cannot be assumed. Various shades of reflexivity are likely to be present. Consequently, the research focussed on the reflective character of risk response scenarios that by-pass reflexivity within modern societies. In the South African case study examined here, the results show that both Beck and Giddens were correct in their conceptions of the modern risk society. Beck believed that autonomous risk responses will direct action back onto the causes of the risks, in order to transform and change the risks, whereas Giddens envisaged responses that are self-aware and reflecting. The two positions are shown to have equal validity since, on the one hand, risk responses can be manipulated through the by-pass scenario to not be reflexive. Instead, society can focus on redefining the risks in a manner that does not lead to change in the causes of the risks. However, part of the nature of the responses can lead to an unintended reflexivity which satisfies Beck's vision.

Attaining Beck's ideal of a fully reflexive modern risk society is consequently not a magic solution to all the troubles facing modern times. It comes with a host of new challenges and intricacies. The factors mentioned in this report are only some of the aspects that risk responses need to be aware of. Beck already identified this 'iceberg' effect when he first published his theory:

> *"Is it sulfur dioxide, nitrogen oxides, their photochemical breakdown products, hydrocarbons, or something else as yet totally unknown, which are giving us the final and eternal autumn – the falling leaves? These chemical formulas appear to stand alone. Behind them, however, companies, industrial sectors, business, scientific and professional groups move into the firing line of public criticism…Those who find themselves in the public pillory as risk producers refute the charges as well as they can, with the aid of a 'counter science' gradually becoming institutionalised in industry, and attempt to bring in other causes and thus other originators. The picture reproduces itself. Access to the media becomes crucial…Good arguments, or at least*

arguments capable of convincing the public, become a condition of business" (Beck, 1992, 31-32).

From the research, it appears as if a 'healthy' state of completely unseen and unintended reflexive modernity will be difficult to achieve amidst the conflict between economic and political powers, and the uncertainties inherent in scientific inquiry. This is certainly shown in the South African case, where the response formulation process simply leads to indecisiveness. It therefore becomes clear that the South African response to climate change can benefit from a more structured revision that takes cognisance of the need to reflexively address the perceived causes of climate risks. This is required if the strategy intends to make a real impact on the risks society faces, rather than merely adapting through accommodation or redefinition of the risks.

The research, however, does support the finding by Matten (2004) that the value of Beck's work lies in "*...providing an interdisciplinary explanatory framework for the new character of environmental problems and the institutional failure of modern societies in tackling risk*." This is shown by the successful conceptualisation and application of a risk response framework that is based on the characteristics inherent to Beck's thesis.

A final question to ask therefore is: Does a risk society perspective provide for a new discourse on environmental issues, thereby changing the way we deal with it - i.e. the questions asked and answers generated?

The research has shown that yes, a risk society perspective certainly can assist in understanding the finer nuances and finding gaps in at least the South African official climate change response. It elucidates the complications centred around a clear definition of which risks are being responded to, and how they are perceived, and in addition creates the opportunity for a revision of recommended response strategies that will ensure that responses go beyond symbolic politics and effect real change in the causes of the climate risks.

Of course response strategies will always be influenced by the short-term priorities and agendas of the political and economic conditions, but the arguments presented in this study should assist in motivating for more meaningful approaches to the spectre of climate change. The question not yet

asked though, is what the NCCRS would have looked like if climatic change was the perceived risk, and socio-economic impacts the context, as opposed to the socio-economic risks merely being framed by climate change debates.

APPENDIX 1 – REFERENCES

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APPENDIX 2 – QUESTIONNAIRE TEMPLATE WITH DETAILED ANALYSIS OF THE NATIONAL CLIMATE CHANGE RESPONSE STRATEGY

Questions	NCCRS Summary	NCCRS Main text
Does the NCCRS respond to modern risks, and if so, what are the characteristics of these risks?		
1. Climate change (CC) implies gradual changes to the global biophysical environment. What risks do these changes pose?	The risks imply disruptions of the world's weather and climate patterns, including impacts on rainfall, extreme weather events and sea level rise. The impacts will be found in the health sector, maize production, plant and animal biodiversity, water resources, and rangelands as areas of highest vulnerability to climate change. The mining and energy sectors are particularly vulnerable to climate change mitigation measures.	Serious disruptions of the world's weather and climate patterns, including impacts on rainfall, extreme weather events and sea level rise. This will lead to adverse effects on the economy, public health and the quality of the environment; significant effects on various sectors of South African society and the economy, pollution, health, water, weather patterns, agriculture, forestry, biodiversity, finances, energy and mining. Global impacts can be expected, but local impacts are the concern.
2. What are the lead causes of the CC risks?	Industrial development is blamed in South Africa, since reference is made to SA's energy and carbon intense economy and emissions that will increase with further economic development.	The strategy refers to the industrial era as cause by apportioning blame to fossil-fuel combustion, especially energy generation, and transportation.
3. How does globalisation add to the risks?	CC is acknowledged as global, but more significant for the economically and physically vulnerable developing world.	Climatic changes are universal, whilst the actual effect will differ according to location and vulnerability.
4. Is there insurance available for the risks identified in the NCCRS?	No mention	No mention
5. Does the NCCRS consider intergenerational aspects such as delayed onset impacts?	Only by referring to sustainable development	Based on a 50year projection
How does the perception of, and information about risks affect the NCCRS?		
6. Does the NCCRS respond to real, tangible impacts or merely possible future effects associated with CC?	Nothing experienced yet, but some direct impacts are foreseen, such as extreme weather events and health risks. Otherwise, a lot of conceived risks are mentioned, such as impacts on human development indicators, industries (farming, mining, energy), and biodiversity, as well as impacts resulting from CC response actions.	Some real climatic changes are acknowledged, but the uncertainty about the scale and implication of climate change is mentioned and with that admitted that the risks are conceptual.

Questions	NCCRS Summary	NCCRS Main text
7. How does global opinion contribute to the conceptualisation of the risks?	International obligations i.t.o. the UNFCCC and Kyoto are acknowledged along with developmental programmes (NEPAD). International CC debates (IPCC) and differences in responses are mentioned. The uncertainty of the international debate is given particular mention.	Global debate about required responses and related global consequences informs the strategy.
8. How do local influences contribute to the conceptualisation of the risks?	Local definition of the risk greatly relies on the Country Studies reports.	Local definition of the risk greatly relies on the Country Studies reports.
9. Which sources are used as references for the NCCRS?	The IPCC TAR is the most scientific source, followed by the South African Country Studies reports. All other possible sources are government position documents or legislation.	TAR, government initiatives, Kyoto procedures, Initial Communication, Country Studies reports
10. Are there uncertainties or assumptions such as incomplete data collection, vague conclusions or precautionary recommendations brought forward from the source documents?	NCCRS is based on the TAR and Initial Communication The Initial Communication was based on the Country Studies reports. The Country Studies acknowledges local uncertainties due to relative course CC modelling in IPCC SAR (globally uncertain) and remaining core CC uncertainties such as CO_2 fertiliser effect. Its science and recommendations have therefore not been adapted to the TAR even though the updated TAR is used in the NCCRS.	NCCRS is based on the TAR and Initial Communication The Initial Communication was based on the Country Studies reports. The Country Studies acknowledges local uncertainties due to relative course CC modelling in IPCC SAR (globally uncertain) and remaining core CC uncertainties such as CO_2 fertiliser effect. Its science and recommendations have therefore not been adapted to the TAR even though the updated TAR is used in the NCCRS.
11. Which specialists or experts (sources that can only be critically reviewed by similar experts) are used to inform and compile the NCCRS?	References include the IPCC and Country studies program, but otherwise no specific sources are mentioned.	Many specific contributions from specialist or expert stakeholders are acknowledged, reference made to the transfer of technology and the appointment of CC specialists in government. It also mentions the expert knowledge residing in industry being required for technical review of CDM projects, and centres of excellence.
12. Will the NCCRS be reviewed, and if so, how?	No other opinions are considered, because the CC reaction is seen as vehicle for further development and not CC mitigation.	Uncertainty regarding integration of response action is considered. Economic modelling studies and scenario analyses are recommended to provide further guidance. A lot of systems are proposed to deal with uncertainty regarding implementation and integration of strategies
13. In future, will the NCCRS seek to improve the sources of CC information and science?	Progress in scientific knowledge and policy trends will only be used to direct actions, not the direction of the policy.	Some further research and technical evaluation are required to inform responses to the main SA industrial threats, but the existing scientific findings are used as is

Questions	NCCRS Summary	NCCRS Main text
14. What is the NCCRS more in need of - better information about the nature of CC risks or more information on adaptation measures?	Research is intended to improve the UNFCCC obligation for better understanding and a reduction of uncertainty in general. This seems to refer to redefinition rather than solutions.	Vague suggestion that research will better define the risks ito direct impacts, and also reference to the UNFCCC obligation to improve understanding and reduce uncertainty in general. Also a call for R and D to address energy conundrum. The focus is stated as being adaptation though.
15. What reliance is there in the NCCRS on catchy concepts such as 'sustainable development'?	Maybe – human development indices are used to motivate for the adaptation approach	An effort is made to reinforce alarmist figures to highlight the need for the policy, whilst here and there the strategy relies on the contested 'sustainable development' concept
16. Does the strategy use simple concepts to communicate complex or abstract ideas?	No – no clear and concise guidelines are provided for action, therefore the complexity remains.	Yes – sustainable energy is reduced to household energy efficiency and the 'key actions' actually refer to a number of specific interventions.
Politics		
17. Are ideological references present in the NCCRS? (e.g. socialism, capitalism, environmentalism)	Sustainable development and human welfare indices. This is reinforced by the distinction between developed and developing nations and their relative wealth. It implies a capitalist or socialist developmental perspective rather than risk response. A pro-technology approach is adopted as potential solution.	Sustainable development references abound, and a particular comment about the historic, inequitable and unsustainable north/south divide of the world's economy and prosperity. Mention is specifically made to natural resources being located in poorer, developing countries, which are exploited by the richer developed countries. In addition, CC is blamed on the wealthy North, with the brunt of the impacts facing the poor South.
18. How are the proposed solutions to local risks affected by global influences?	Research, agreement and action by developed nations are seen as the global solution, with developing countries offering support or implementation opportunities (CDM projects). This is partially due to international pressure for CC commitments. Global co-ordination in science and policy is mentioned, as are supranational response programmes. International response action and its relation to global inequality also mentioned.	References are made to the UNFCCC and Kyoto negotiations, IPCC findings and G77+China bloc, as well as int'l competition for CC response benefits such as funding and CDM. CDM administration is also internationally organised. Global greenhouse gas stabilisation will have local investment and trade implications. CC is specifically seen as an opportunity to promote local sustainable development principles.
19. How are the proposed solutions to global risks affected by local aspects?	Commitment to UNFCCC obligations, Southern Africa role player, opportunity for CDM implementation	Commitment to UNFCCC obligations, Southern Africa role player, opportunity for CDM implementation
20. Who is involved in the NCCRS?	DEAT, SANBI, Academia, CSIR (Country Studies)	ARC, Mining, CAIA, CSIR, Resource Departments, Health, DST, DTI, Dept Transport, Env Justice, Eskom, IEF, DEAT (NCCC), NRF, Stats SA, SANBI, SASOL, Treasury, SE&CCP, Academia, IIEC-Africa, PEER Africa

Questions	NCCRS Summary	NCCRS Main text
21. Who is not involved in the NCCRS?	Local and provincial authorities, Environmental groups	General society, Academia, Industry, Environmental groups. These are all listed as future participants. Otherwise also private and non-governmental sectors, other tiers of government.
22. Does the strategy hide its true intentions (i.e. is the original reason for the strategy different from the intended outcomes)?	No – the true intentions are not hidden – environment (and risks) is used as vehicle for growth	No – the true intentions are not hidden – CC should not detrimentally affect economic development
Reflexivity		
23. Is the response aimed at accommodating risks through adaptation measures or redefinition of the risks?	Research is intended to improve the UNFCCC obligation for better understanding and a reduction of uncertainty in general. This seems to refer to redefinition rather than solutions.	Vague suggestion that research will better define the risks ito direct impacts, and also reference to the UNFCCC obligation to improve understanding and reduce uncertainty in general. Also a call for RandD to address energy conundrum. The focus is stated as being adaptation though.
24. Will the response intentionally affect or prevent the primary causes of the risks, or will such changes be incidental?	Only insofar as the proposed adaptation will influence production techniques in a manner that will also mitigate the CC contributions.	It finds solutions in adapting to the risks, not changing the risks except where the proposed adaptation will influence production techniques in a manner that will also mitigate the CC contributions.
25. Will the national response change the nature of our modernisation and development path, or can we continue as is?	*Status quo* of economic development to be preserved	All responses to be consistent with development needs and government priorities, except the energy sector that will probably face changes
26. Does the NCCRS propose more modernisation or scientific progress to address CC issues?	CC is seen as opportunity to promote modernisation. Technological change/improvement will reduce local vulnerability and address the global problem.	Maybe, CC offers opportunities for development that will aid in adaptation. It does not address the original risk, only the impacts with risks affected as by-product. CC is seen as opportunity to promote modernisation.
Responses		
27. Which response actions are informed by certainty regarding CC risks?	Although some uncertainty in base data is acknowledged, the information and recommendations of the source documents are accepted as is, and adaptation measures aimed at economic gain advised.	No attempt is made to quantify the uncertainty, yet as many responses as possible are advised

Questions	NCCRS Summary	NCCRS Main text
28. Which response actions are informed by uncertainty regarding CC risks?	Research and action plans relating to mitigation will compensate for changes in international debate and trends	The uncertainty regarding actual impacts is used to allow for any intervention. Mitigation is treated lightly due to the strategy not wanting to affect the macro-economic context.
29. Does the NCCRS differentiate between substantive and non-substantive risks?	No effort evident, not even in the Country Study. The need for adaptation is assumed based on an acceptance of 'general vulnerability'.	No – all risks are considered worthy of a response
30. Which indicators and measures of responsibility are proposed, or is the mere existence of the policy enough?	Existence. No measures of performance are instituted.	Existence, since no targets are set
31. Does the NCCRS propose any regulation?	Regulation is to occur through means of the DME energy initiatives, DTI, DWAF and N/GCCC, not the CCRS specifically	Some regulation on emissions and water management
32. Does the NCCRS envisage any self-regulation?	No mention of self-regulation, only self-monitoring.	No, still reliance on law reform