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Ethical Implications of Global Climate Change

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Preface

The aim of this report is to serve as a point of departure for discussion among members of the scientific community of UNESCO, the NGOs working with UNESCO, and member states of UNESCO on the ethical challenges posed by global climate change. In particular, the focus of this document falls on a clarification of:

1. The **central ethical issues** that are brought about by global climate change
2. The **general and specific principles** that could be adopted to form a basis of responding to these issues.

While it is not the purpose of this document to formulate proposals for particular actions by member states, certain recommendations about the ethical implications of climate change will be made to the Director-General of UNESCO in a separate document.

It is taken as an important point of departure that global climate change is a matter of great concern for humankind, posing perhaps the greatest challenge that humankind has faced in its entire history. However, this report is characterized not so much by a language of concern, as it is by a language of response. In this ethics of response to the various effects of global climate change, two central points, among others, will be highlighted: the importance of sharing the burden in these responses, and the importance of building a sound basis of scientific knowledge to guide these responses.

As it will be shown in this report, it is not always clear how to conceptualize many of the ethical questions raised by the various effects of global climate change, and on what basis to choose between different conceptualizations. It is also not clear how to interpret the common but differentiated responsibilities that international organizations, nation states, governments, non-governmental organizations, businesses, or individuals may have in responding to global climate change. Similarly, it is not always clear whether our conventional approaches to moral decision-making, or the dominant conceptual frameworks we use in this regard, are adequate to articulate the ethical challenges of global climate change and our responses to it.

It is with this kind of uncertainty in mind that this report was drafted, in particular to offer some guidelines in a situation where few, if any guidelines are obvious. At minimum, one of the objectives of this report is to stimulate rational debate about the moral basis of our responses to climate change, on the policy level as well as in the domain of action.

Building on previous work done in COMEST on environmental ethics,¹ this report is not intended to duplicate any of the work done on climate change in UNESCO or the broader family of United Nations Organizations, but rather to support it – by highlighting the often subtle, but nonetheless highly important ethical implications of climate change that are often shifted to the background when issues of hard science, economics, and international politics are discussed.

This report has been initiated in direct response to the request of the General Conference of UNESCO addressed to the Director-General of UNESCO to develop a *UNESCO Strategy for Action on Climate Change* that aims “to build

¹ Details about previous work done in COMEST on environmental ethics can be found at www.unesco.org/COMEST

and maintain the requisite knowledge base, and to adopt measures to adapt to the impacts of climate change, contribute to the mitigation of its causes, and strengthen sustainable development” (Executive Board Document 180 EX/16, p. 1).² Without serious attention to the ethical implications of climate change, this Strategy for Action may not be as strong as it can be.

Similarly, this report acknowledges and support other work that is done on climate change within the network of United Nations organizations, for instance the United Nations Framework Convention on Climate Change (UNFCCC), and the Intergovernmental Panel on Climate Change (IPCC) that was formed in 1988 by the World Meteorological Organization and the United Nations Environment Programme (UNEP).³ The ongoing work of the IPCC in establishing a scientific basis for discussions on climate change, and the ongoing negotiations between parties to the UNFCCC with a view to entering into binding international agreements on mechanisms and targets to address the challenges of climate change – these are all accepted as points of reference for the work of COMEST on an ethics of climate change.

It is furthermore acknowledged in this report that many of the ethical dimensions of climate change are already implicitly recognized in the work of bodies such as the IPCC and the UNFCCC – and in the international politics around it. In this regard, the *Fourth Assessment Report* of the IPCC (published in 2007) is of particular importance, as well as the Bali Road Map that was produced at the 13th Session of the Conference of the Parties to the UNFCCC (COP 13) in December 2007, as well as the resolutions of COP 14 that was held in December 2008 in Poznań, Poland.

It is important to foreground these implicit ethical dimensions so that they can be explicitly debated, as well as to clarify the ethical basis of our responses to global climate change. The outcomes of this report, that will be made available to member states of UNESCO during October 2009, can thus be highly relevant to the discussions of COP 15 that will be held in Copenhagen in December 2009 to finalize the climate change dispensation that will be implemented from 2012 when the commitment period of the Kyoto Protocol expires.

It should be mentioned that this report would not have been possible without the valuable work that was done by the pioneers of climate change ethics, in particular Dale Jamieson, Donald Brown, Stephen Gardiner, Peter Singer, Henry Shue and the Rock Ethics Institute of Pennsylvania State University (where Donald Brown plays a leading role). The White Paper on the Ethical Dimensions of Climate Change (not dated), and the The Buenos Aires Draft Declaration on the Ethical Dimensions of Climate Change (2004) were both initiated by the Rock Ethics Institute, and both of these documents serve as invaluable points of reference for this report.

Lastly, a word of thanks to everyone who commented on previous drafts and made invaluable suggestions towards improving this report. Here and there you will be able to recognize your contribution in the text.

² For an overview of the work done in UNESCO on climate change, the following website can be consulted: www.unesco.org/en/climate-change

³ For an overview of the work done in the United Nations on climate change, the following website can be consulted: <http://www.un.org/climatechange/>

1. Introduction

Global climate change has, without any doubt, become the “defining issue of our era”, as the United Nations Secretary-General, Mr Ban Ki-moon has pointed out. After the *Fourth Assessment Report* of the IPCC that was published in 2007, it can be stated unequivocally that global climate change exists, that it is contributed to by past and present human activities, and that it poses one, if not the biggest threat to the future of life on earth as we know it. Entailing much more than rising average temperatures, but also long-term changes in precipitation amounts, high-tide levels, ocean salinity and acidity (pH), wind patterns and extreme weather events, including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones, that include hurricanes and typhoons (IPCC 2007a: 7), global climate change confronts humanity with the practical challenge of building a sound scientific understanding of the mechanisms through which it unfolds, and on the basis of that knowledge, to mitigate its intensity as far as is humanly possible, and adapt to its effects that cannot be avoided.

As such, global climate change confronts humanity arguably with the most serious ethical challenge that it has ever faced. Indeed, far reaching ethical questions can be asked about the continuation of human actions that not only cause climate change, but also contribute to its intensification and acceleration. Equally serious ethical questions arise in the context of our responses to global climate change. Is there a duty to mitigate the intensity of global climate change, and if there is, how far does this duty extend, and who carries the burden of this duty on what basis? Similarly, is there a duty on those who have caused global climate change, to assist people who are already suffering, or will suffer in future, the negative consequences of it, but are not in the position to adapt to, or avoid these consequences on their own? Is there a duty to share knowledge about the nature, extent and tempo of global climate change, in particular with those vulnerable to its negative impacts that are not in a position to gather or use that knowledge on their own? And how should we refer to those people who have been displaced by climate change effects such as droughts or floods: should we refer to them as “climate change migrants” or “climate change refugees”, and on what basis do we choose between these two designations if we know that the first commonly can entail refusal of entry into a state, while the latter implies that entry into a state of refuge cannot be denied? Indeed, what would principles such as “fairness” and “responsibility” and “justice” and “freedom” mean in the face of global climate change? And do these principles have the same connotations and implications in the contexts of science, mitigation and adaption respectively?

It is questions like these that point to the ethical implications of global climate change, and the importance of these questions almost speaks for itself: the answers we give to them have far reaching implications for the immediate or future well-being of vast numbers of people who are the immediate victims of global climate change, or fall in the vague category of those causing it. The fact of the matter is, however, that these ethical questions are mostly not made explicit in discussions about climate change, and therefore are not adequately scrutinized or debated. What is commonly found, is that climate change discussions predominantly take place on a factual and technical level, i.e. they focus on factual issues around the causes, the impacts and the effects of climate change, or on technical policy issues regarding responses to its challenges, while the ethical implications of global climate change are not clearly articulated and explicitly discussed in these factual analyses and the policies that are built on them. As Ten Have (2006: 11) has pointed out with regard to responses to environmental problems in general, there seems to be a tendency to move directly from concerns about climate change to climate change action, without self-consciously and critically reflecting on the aims, the nature, the extent and

the justification of these actions. Thus, the ethics already embedded in concerns about and responses to global climate change are shifted to the background, and effectively taken off the agenda of matters that need to be seriously considered.

The aim of this report is to foreground the ethical implications of global climate change, and to demonstrate what differences it could make if these ethical implications were taken seriously in the policy proposals that are made at international, regional and national levels with a view to developing a sound scientific understanding of climate change, to mitigate its intensity, and to adapt to its unavoidable effects. However, it is not obvious what these ethical implications are, and it is sometimes difficult to articulate the moral basis of our responses to these ethical challenges. In part this has to do with the extreme complexity of global climate change as a concrete phenomenon unfolding in time, but in part it also has to do with the conventional conceptual frameworks and decision-making strategies with which we conceptualize and respond to the challenges of global climate change.

Furthermore, the ethical implications of global climate change are often obscured by the combination of (a) uncertainties that relate to scientific knowledge about the nature, scope and possible outcomes of the phenomena constituting climate change; and (b) uncertainties that relate to the overlapping or competing grounds for obligation and to their unclear application to complex issues. In addition, public debate has often tended to short-circuit such uncertainties and to give the impression that things are clearer than they are.

A good place to start is with an overview of the uncertainties conjured up by the complexity of global climate change. These uncertainties will be articulated in Section 2 within the framework of, and with reference to that which is not disputed in our knowledge about climate change. The last part of section 2 is devoted to an overview of the characteristics of global climate change, in which particular emphasis will fall on the complexity of this phenomenon as it unfolds in time, and how this complexity affects our understanding of the ethical implications of global climate change.

Section 3 of this report provides an overview of the basis, nature and scope of ethics with a view to identifying the ethical principles that should inform rational debate about climate change, while section 4 will be devoted to an overview of the principles that are already available in the international arena to address the ethical issues related to climate change. Section 5 entails a discussion of a number of core themes that should form an essential part of critical dialogue in the context of developing ethically justifiable responses to the challenges of global climate change. Section 6 summarises the main argument of this report.

2. Uncertainties related to climate change

Substantively speaking, climate change is a practical challenge to human societies that has, in recorded history, led to the collapse of whole civilizations. Current processes of climate change, however, are specific in several respects that create challenges above and beyond what is inherent in the usual interactions between human societies and ecosystems:

1. Analytical and predictive knowledge is available that enable us to foresee, to mitigate and to adapt to the effects of climate change in a manner that was not possible in earlier times.
2. On the basis of that knowledge, it is also possible now to discern a causal link between human action and current processes of climate

- change, as well as to establish that earlier processes of climate change were predominantly natural phenomena.
3. Humanity collectively has greater capacity than ever before to address climate challenges, but at the same time the speed of change may exceed adaptation capability, and some groups may be more vulnerable than in earlier periods.
 4. Due to a growing “universalization” of ethics, the scope and nature of ethical concerns currently acknowledged globally have evolved to include issues wider than only those related to human-human interactions.
 5. There is a growing realization that human well-being is dependent on ecosystem integrity, biodiversity, and a stable climate system, and therefore that a purely human-centred approach to policy- and decision-making can no longer be taken for granted.
 6. Our current knowledge of ecosystems and the impacts of our actions on these ecosystems is incomplete, and this generates uncertain obligations to foresee, to prevent, to mitigate and to adapt to the negative effects of our impacts.

Taken together, these observations point to a double set of uncertainties that, paradoxically, emerge from within a framework of well-established and undisputed knowledge about global climate change. On the one hand, in spite of scientific consensus that global climate change indeed exists, and that it is contributed to by past and present human action, there are a number of scientific uncertainties about climate change that make it difficult to form a clear picture of the ethical implications of global climate change. On the other hand, in spite of a growing consensus that global climate change is seriously affecting the well-being of the whole of humanity living now and in the future, and also that it is affecting some groups and some nations more than others, it is unclear what exactly the ethical challenges of global climate change are, and on the basis of which moral considerations we should take what action to address these challenges. But before we turn to a discussion of these uncertainties, it is necessary to clarify the relationship between the concepts of “the greenhouse effect”, “global warming” and “climate change” which are commonly confused with one another in popular debates.

2.1 *Climate change, global warming, and the greenhouse effect*

The notion of *climate change* must be separated from the narrower concepts of *global warming* and the *greenhouse effect*. According to the *Fourth Assessment Report* of the IPCC, the “earth’s natural greenhouse effect makes life as we know it possible. However, human activities, primarily the burning of fossil fuels and clearing of forests, have greatly intensified the natural greenhouse effect, causing global warming”. (IPCC, 2007a: 98) Basically the greenhouse effect consists of a physical process by which that thermal radiation originating from the sun that is not absorbed by the surface of the earth, is deflected by the oceans and land to be absorbed by greenhouse gases present in the atmosphere, including water vapour (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and ozone (O₃), and reradiated back to earth. Analogous to a greenhouse built of glass walls warming up from the inside when the sun shines on it, the earth’s temperature thus rises to levels that are higher than it would have been without the presence of greenhouse gases. The greenhouse effect is thus a natural process, although human activities can greatly intensify this natural process to cause global warming.

Global warming refers to “the gradual increase, observed or projected, in global surface temperature, as one of the consequences of radiative forcing caused by anthropogenic emissions”. (IPCC 2007c: 101) The global average surface temperature of the earth is calculated from changes in the area-weighted global average of the sea surface temperature and land surface air temperature respectively. (IPCC 2007a: 134) Human induced global warming is caused by adding more greenhouse gases to the earth’s atmosphere, whereby the greenhouse effect is intensified. The Fourth Assessment Report of the IPCC states that an unprecedented increase in greenhouse gas concentrations in the atmosphere has been recorded since the onset of the industrial era in 1750, and that this has led to increases in the average global surface temperature of the earth over the last 100 years.

Article 1 of the UN Framework Convention on Climate Change (UNFCCC), defines *climate change* as:

... a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. (UNFCCC, Article 1)

In principle this means that climate change could also include global cooling, and even an ice age, as some scientists predict may occur if the salinity of the sea is altered to such an extent that the thermohaline circulation which underlies the flow of the North Atlantic Gulf Stream is interrupted.

In contrast, the IPCC defines climate change as “any change in climate over time, whether due to natural variability or as a result of human activity”. (IPCC 2007a: 2) It furthermore states, however, that “warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level” (IPCC 2007a: 5), and adds:

The understanding of anthropogenic warming and cooling influences on climate has improved since the TAR (*Third Assessment Report*), leading to *very high confidence* that the global average net effect of human activities since 1750 has been one of warming ... (IPCC 2007a: 3)

Climate change, however, entails much more than rising average temperatures. It is also evident from long-term changes in precipitation amounts, ocean salinity and pH, wind patterns and aspects of extreme weather, including droughts, heavy precipitation, heat waves and the intensity of tropical cyclones, that include hurricanes and typhoons (IPCC 2007a: 7).

2.2 *Uncertainties in the scientific knowledge base*

Climate change confronts us with a strange paradox. On the one hand, we currently have analytic and predictive knowledge that enables us to foresee, prevent, mitigate and adapt to aspects of climate change that were not possible in earlier times. On the other hand, we are still confronted with a number of uncertainties in our scientific knowledge base that combine to put constraints on our ability to exactly predict when and where and with what intensity which effects of climate change will emerge. The sources of these uncertainties include:

1. Incomplete factual data on aspects of climate change (i.e. uncertainties caused by observation gaps).
2. Limitations in science (i.e. uncertainties caused by the applicability, and predictive capacity of scientific models).

3. The boundaries of our conceptual schemes; (i.e. uncertainties caused by the nature, assumptions and scope of current theoretical frameworks available to understand global climate change).
4. Epistemological constraints (i.e. uncertainties caused by the methodologies typically followed by natural science – that commonly exclude the human dimensions of climate change).

The sub-sections below give a thumbnail sketch of the first two of these sources – with a view to demonstrating that the uncertainties that they give rise to, are already in themselves ethical challenges.

2.2.1 Gaps in our observation of climate change

All predictions about future climate change trends start with gathering factual data at a certain place over an extended period of time. Currently, the most comprehensive interpretation of climate change data can be found in the assessment reports of the IPCC. Drawing on historical records, as well as biological, fossil and geological “records” it is possible for science to determine what climatic conditions were for hundreds of thousands of years. However, in spite of this impressive data set that has been built up, there still are numerous gaps in the observation basis of our knowledge about climate change.

In its overview of the physical science basis of climate change, the IPCC, for instance, states with reference to the Polar Regions (IPCC 2007a: 902 - 909) that the large natural variability on interannual, decadal and longer time scales of polar climate is an important source of uncertainty (p. 903). It further states that “understanding of the polar climate system is still incomplete due to its complex atmosphere-land-cryosphere-ocean-ecosystem interactions involving a variety of distinctive feedbacks” (p. 903). While models are constructed to form an understanding of these interactions, the problem is a lack of observations of clouds, precipitation, wind, sea ice and ocean currents against which the models can be assessed. Similar observation gaps hamper the understanding of the interactions between land-use, ground cover, and ocean temperature in the understanding of rainfall patterns in the Sahel. (IPCC 2007a: 866 – 871) Such observation gaps clearly make simulations of future climate very difficult, and may reduce confidence in projections of climate change trends.

Observation gaps of another kind exist of climate data in southern countries and continents. This is evident from the number of studies and databases that informed the *Fourth Assessment Report (AR4)* of the IPCC. Relative to the abundance of data about climate conditions in the North, the data about climate conditions in the South appears to be thin (IPCC 2007d: 32), and again this can reduce confidence in predictions about climate change trends in the South.

From these observations, two important conclusions follow. Firstly, it is of crucial importance for scientists to identify the observation gaps in the scientific basis of their knowledge about climate change, and to actively follow strategies to fill these gaps. Secondly, it is equally important to communicate to policy-makers as well as the broad public, where the information gaps are and what implications these gaps have for the confidence with which climate change trends can be predicted. Since the public as well as policy-makers are dependent on the information provided to them by scientists to understand and appropriately respond to the risks and threats of climate change, it can be stated that there rests a clear duty on scientists to provide a picture of climate change that is as complete and reliable as possible.

2.2.2 Limitations in climate change science

Besides uncertainties generated by gaps in observation data, scientists also experience uncertainties with regards to the predictive models that are used to interpret observation data. To this they refer as problems of science, structural uncertainty. (IPCC 2007e: 1) While many of these models take into account both natural variance and the contribution of human actions to climate change trends, it is sometimes not possible to use these models for predictions that are other than general and global in scope, and therefore vague. Scientists would also concede that it is not possible to predict extreme weather events long in advance. Nor is it possible to predict with accuracy exactly how or when a specific region may be affected by climate change trends.

And yet, climate scientists claim with very high levels of confidence that if we can manage to contain the average global temperature to levels of less than 2°C above pre-industrial levels, we are likely to stabilize climate change trends, and avert catastrophic effects in the future. At the same time, predictive models show that if average global temperatures are allowed to soar to about 6°C above pre-industrial levels, a “tipping point” may be reached by the end of this century that will introduce dangerous and irreversible climate change effects (Northcott 2007: 21).

When it comes to more accurate predictions however, one would be hard pressed to find a climate scientist that would claim absolute certainty for it. For example: some predictive models envisage a gradual melting of Arctic ice that will eventually lead to a “blue Arctic Ocean” in 2070. Other predictive models, though, taking into account other observational data, predict a “blue Arctic Ocean” as early as 2030. The upshot of this is that even scientists are uncertain about specific events that may occur because of climate change.

Having said this, it follows that scientists not only have to actively engage with the observational gaps in the knowledge base about climate change. They also have to continually improve on the predictive models that they use on global and regional scales to interpret observational data and generate simulations of future climate trends. With better models, more accurate simulations can be produced – which, in turn, will equip policy-makers as well as the public to make better decisions in the high-stake context of determining what to do in response to climate change. As such, science problems are not merely puzzles to solve for the sheer pleasure of it, but rather a crucial exercise that humankind depends on for its well-being.

2.3 Climate change as a source of ethical uncertainty

Climate change confronts us with a different set of uncertainties with regards to ethics: we seem to be uncertain about the basis and substance of our obligations to foresee, to prevent and to adapt to climate change; we seem to be uncertain about how to act on the knowledge that there is a causal link between human action and climate change; and we are uncertain about how to relate to those that are vulnerable to climate change, in distinction from those that clearly contribute to climate change. A better understanding of these uncertainties will emerge when we consider what we know about the threats that global climate change already pose to the well-being of people living now and in the immediate future, and when we consider some of the characteristics particular to global climate change.

2.3.1 Threats of global climate change to human well-being

It is well-established that global climate change not only entails rising average temperatures on earth, but also long term changes in precipitation and weather patterns. These trends already are, and will increasingly be manifested in extreme weather events that include floods in some parts of the world and droughts in other parts, or intermittent floods and droughts in the same part of the world, as well as an increase in the intensity and frequency of typhoons, tornados and hurricanes. Also directly associated with global climate change is rising sea levels due to the fact that warmer water takes up more space, as well as the melting of polar ice and glaciers over and above natural variances. In addition, the best climate change models currently available, are predicting that these changes, in spite of all mitigation efforts, and under the best case scenarios, will set in at a pace that within the next 100 years hundreds of millions of people will be directly affected, while no nation on earth will escape its indirect effects. If mitigation targets envisioned for the next 50 years are not reached, these effects may set in much sooner, and affect more people than currently expected and planned for.

People most vulnerable to the direct effects of global climate change are those living in low lying areas prone to *flooding* such as small islands, large river deltas and certain coastal areas, as well as those living in the Arctic where the *melting of polar ice* is threatening their livelihoods and traditional way of life. Equally vulnerable are those people living in arid or semi-arid regions who already are, or will be the victims of prolonged *droughts* – such as are predicted in particular for parts of Africa, south Asia and South America. As the heat waves in Europe in 2003 and in Europe and Asia in 2005 demonstrated, other vulnerable groups are the *elderly people* and *children*, despite the social stratum they belong to. Elderly people suffer of heat most of all with heart and blood pressure problems; children become amenable to cold and angina. These effects are worse for the *poor*, who have no means to avoid or adapt to rapid changes in the climate. Irrespective of where they live, the poor in inner city and other urban areas, as well as those in rural poverty are equally vulnerable. A less well defined group of possible victims of global climate change are those who will bear the brunt of *extreme weather events* such as flooding, or storms such as typhoons, tornados and hurricanes. Another category of possible victims are those who will be exposed to *infectious diseases* that were unknown to them before because of shifts in the range of disease vectors due to rising average temperatures.

Furthermore, it is important to mention that global climate change does and will not affect humans alone, but also diminish the flourishing and integrity of the biosphere as a whole, which include a reduction in biodiversity, less resilient ecosystems, and adding to the suffering of countless animals, domestic as well as wild. This interaction between the well-being of humans and animals is clearly illustrated by the effects of ocean acidification on coral reefs, fish, and the livelihoods of people living in tropical coastal regions and islands. Given that people in these areas are heavily dependent upon fish for their protein, the decline in coral reefs predicted due to the increased acidity of the oceans will have a major impact. Coral animals need calcium carbonate to build their shells, but more acidic oceans makes this chemically much more difficult. Loss of coral reef, which serve as the nursery and base of the food chain for so many fish species, will thus have a direct impact on the lives and livelihoods of many people in these regions.

All of these categories of vulnerabilities are linked to the harm that can follow from the immediate threats of extreme climate events. Formulated in specific

terms, this general category of harm can be broken down in more detail to include:

1. Threats to the lives of people, animals and plants living on small islands, or in large river deltas or other low lying areas.
2. Threats to the wealth, property and livelihoods, including traditional livelihoods, of people exposed to climate change events such as regular floods, prolonged droughts, frequent storms, the loss of coral reefs, or melting ice.
3. Threats to the health of people, animals and plants that become exposed to disease vectors that shifted in range as a result of changes in climate.
4. Threats to cultural heritage, mainly to traditional ways of living, or to architectural masterpieces of various kinds, particularly in the case of sudden irreversible submergence of inhabited land.
5. Threats to local, regional and global ecosystems.
6. Threats to political and economic stability in states first and foremost vulnerable to the negative impacts of climate change.
7. Threats of possible mass emigrations by climate change refugees, particularly in the case of sudden irreversible submergence of inhabited land.
8. Possible threats to the economy or health-status of countries forced to accept refugees.
9. Possible threats to the world order and world economy.
10. Threats to the dignity of people who become victims of climate change.

Formulated thus, it is clear that global climate change poses a clear and present threat to the well-being of the community of life on earth – which includes non-human life, but also the social and cultural dimensions of human existence. As such, global climate change clearly is a matter of serious ethical concern. However, as clear as it may be that climate change deserves focused ethical consideration and intervention, it is not obvious how to do so. It seems as if the phenomenon of vulnerability and the threat of climate change is not well understood, and where it is indeed used as a point of departure for disaster relief or adaptation measures, it is not clear exactly how to approach these vulnerabilities and threats as long term phenomena.

Which brings us to yet more of the ethical uncertainties that have to be taken into account. Taken together, these uncertainties cluster around a set of more subtle threats than that of harm to the material or physical well-being of the community of life; they have to do with threats to the dignity or the rights of people, and include issues of the following kind:

1. Issues of distributive justice – some people and some nations carry an unfair burden in suffering the negative consequences of climate change, and these are not the same people and nations who contribute most of all to climate change. In addition, those who earlier caused the harm did not know it was one at the time. They mostly thought they were helping future generations by bringing on the fruits of “progress” to the good of all. Here the ethical uncertainty lies in determining exactly what is unfair and unjust in the distribution of the negative consequences of climate change; but at the same time determining exactly what is unfair and unjust in the distribution of the benefits of actions that cause climate change. Another uncertainty lies in determining exactly what to do in the face of such distributive injustices.
2. Issues of compensatory justice – if people who suffer the consequences of climate change are not those who caused it, can they legitimately claim compensation from those who caused it? While a general ethical principle

exists that those who have caused harm to others should be held accountable for it and even compensate those that have been harmed, it is not exactly clear within the context of global climate change how to determine causal blame. This is because climate change is the result of the collective action of numerous agents: nations, institutions, businesses and individuals. It is also not clear how to determine causal blame if global climate change is attributable not only to the collective action of the present generation, but to the collective action of a series of previous generations going back to the beginning of the industrial era around 1750. But even if these issues could be resolved, another ethical uncertainty in this context has to do with the nature and extent of compensatory justice, who exactly the beneficiaries should be, and how exactly the benefits of compensatory justice should be distributed. For instance: should claims to compensatory justice extend to countries who may experience loss of revenue because of caps placed on CO₂ emissions, thus lowering the demand for oil?

3. Issues of procedural justice – who should participate in which processes of decision-making about measures to prevent, mitigate or adapt to climate change? The questions and uncertainties that arise in this regard are numerous and are not resolved yet: Who are currently in fact included and who are in fact excluded from this decision-making – through which mechanisms? Who are entitled to take part in these decision-making processes? How can it be ensured that vulnerable groups (the elderly, the sick, the poor, indigenous peoples) can effectively participate in decision-making about climate change responses? How can it be ensured that local and traditional knowledge is respected and effectively integrated in deliberations and decision-making in particular about adaptation?
4. Issues of human rights. Some of the ethical uncertainties lie in the question whether the human rights guaranteed by international instruments such as the Universal Declaration of Human Rights of 1948 (UDHR) are put under threat by global climate change, and if so, to what extent, and what, if anything, could be done about it? Other ethical uncertainties lie in the converse of this question: Can nations or individuals appeal to the human rights guaranteed by, for instance the UDHR, to coerce certain nations, institutions or individuals to stop those actions that cause global climate change, or to claim compensation from them if they do not? If yes, how could this be done and through which mechanisms and structures? And if not, why not? In more specific terms, does global climate change have any implications for the basic right to liberty, which includes a person's right to use his/her property to enhance his/her well-being as he/she sees fit, as well as the right to freely choose one's own way of life? Does global climate change undermine this right to liberty; or conversely, can anyone legitimately appeal to the right to liberty to pursue actions that contribute to the causes of climate change?

Within the context of global climate change, it is not obvious how to answer these questions related to justice and human rights; they point to some of the most difficult questions that can be asked in ethics, namely how to recognize and respect other persons, in particular when they are vulnerable and do not have the power to make their voices heard in the international, regional or national contexts. In the context of decision-making about ways and means to prevent, mitigate or adapt to global climate change, it is even more difficult to answer these questions of recognition and respect.

2.3.2 *Ethical uncertainties related to the main characteristics of global climate change*

An overview of the main characteristics of global climate change reveal a number of other uncertainties that make it difficult to develop an ethical discourse about some aspects of climate change, specifically with regards to the agencies – nations, states, policy-makers, corporations, and consumers – mostly responsible for activities which have caused climate change, and who should therefore be mostly responsible to take action for its mitigation. These characteristics include:

- the global dispersion of the causes and effects of climate change
- the fragmentation of agency that makes it difficult to respond to global climate change
- institutional inadequacy that makes it difficult to respond to global climate change
- the persistence, non-linearity and time-delayed nature of climate change.

Gardiner (2006) discusses these characteristics of climate change with insight, and concludes that they make it very difficult to respond to the challenges of climate change. It is commonly acknowledged that the effects of climate change are typically not experienced at the source of emission of greenhouse gases, but at distant locations, and with a time-delay of decades, if not centuries. It is also commonly acknowledged that climate change is caused by large numbers of people and institutions that are geographically dispersed, and not united by a common framework of interests or action. This clearly makes it extremely difficult to determine which agents exactly are to blame and to be held accountable for causing climate change. Similarly, this makes it extremely difficult to determine who should take the lead in responding to climate change. Is there, for instance, a special obligation on those who have caused climate change, or those who enjoy the benefits of the economic progress that is inadvertently brought about by climate change, to act first in responding to climate change challenges? But exactly how are these agents to be identified, and how far would their obligations extend?

Regardless of the answers to the previous questions, the unity and the coordination of responses between nations, and among agents within nations, to adequately respond to the challenges of global climate change seems equally difficult to achieve, not only because the nations and agents within the current time frame are divided by different geographical locations, interests and political agendas, but also because it is not only this generation that needs to act, but also future generations. The obvious ethical dilemma is that different generations do not share the same time horizon, and thus cannot influence one another reciprocally. The important ethical uncertainty that emerges from this, is not so much what we should appeal to when we consider the interests of future generations (we obviously have to respect the dignity and well-being of future generations as much as we do our own), but exactly how much can be reasonably and ethically expected of us to sacrifice in our time for the sake of the well-being of future generations, and for exactly how many generations should we make these sacrifices? Since it is very easy for any current generation to make no sacrifices at all for the well-being of future generations, another important ethical uncertainty that arises, is how we can ensure that our current generation really do what is at least minimally required to put the next generation not in a position that is worse than ours – in so far as this is physically possible in the face of global climate change trends? And how can we prevent the cynical response in which it is argued that future generations can take care of their own challenges, we do not have to worry about them now. A third ethical uncertainty that arises in this context, is whether the present generation, since it has enjoyed the benefits of climate changing actions, has a special obligation to equip and

empower the next generation with knowledge, technologies and opportunities that enable them to better cope with the challenges of climate change than we do currently.

Another complicating factor in responding to the challenges of climate change identified by Gardiner (2006) is institutional inadequacy. Besides the fact that it is not clear which institutions should take the lead in responding to the challenges of climate change, it is also not clear whether the current institutions that do take the lead (nation states and international organizations) are geared to effectively respond. Part of the problem seems to be that current structures and strategies for international decision-making are not conducive towards international cooperation, collective decision-making and joint action. Dominated by *the principle of national sovereignty*, it seems as if the interests of individual nation states continue to be an obstacle in finding agreement on international treaties geared towards jointly tackling climate change. But even if some nations express their willingness from international platforms to implement bold measures, *the principle of conditionality*⁴ always seems to apply, with the result that only one dissenting nation can prevent any international action from being implemented.⁵ One of the ethical uncertainties lies in the question whether there exists an obligation on each and every nation or agent that can act, to take that action regardless of what other nations or agents say or do. If such an obligation exists, and if sufficient agreement on future joint action can be reached, a further uncertainty lies in the question how much of that action should be taken and for how long; and what should be done about those nations or agents who can act but don't, but at the same time enjoy the benefits of others' actions.⁶

Gardiner (2006) further points out that climate change constitutes a persistent problem with effects that are non-linear and seriously time-delayed. Climate change experts agree on the fact that CO₂, one of the most important greenhouse gases, stays in the earth's atmosphere for a very long time, some say for 5 to 200 years which gives us room for hope, while others claim that a certain proportion of it stays in the atmosphere for thousands of years. Since it is extremely difficult to extract CO₂ from the atmosphere once it is deposited there, constant increases in, or even a steady continuation of CO₂ emissions will lead to an accumulation of this greenhouse gas that is not easily reversible. According to Gardiner (2006) all climate change effects are at the same time time-delayed. This means that any effects of climate change that we experience now, have been caused by greenhouse gas emissions of a previous era. Similarly, current CO₂ emissions will only have an effect in some future time.

But climate change experts also agree that increases in atmospheric CO₂ causes non-linear or threshold effects in the climate system— which means that the climate system can suddenly change into another state, which can have unpredictable effects in terms of average temperatures rising at a faster rate than before, more intense droughts and floods, and increased extreme weather events such as typhoons, tornados and hurricanes. Put on a time line crossing generations, this means that if nothing is done about climate change by generation A, generation B following it, does not merely receive a package of problems of the same magnitude that generation A has faced, but a different set of problems that can be of a far greater magnitude than existed before. Another

⁴ Formulated in popular terms, the principle of conditionality states that Nation A will only act if all other Nations commit to joint action, and in fact participate in joint action.

⁵ Gardiner (2006) links this problem in game theoretical terms to the prisoner's dilemma, and discusses the implications of the prisoner's dilemma for decision-making about climate change at length.

⁶ This can be described as the free rider problem.

way to make the same point, is to say that if generation A does nothing about climate change, it does not merely add to the problem of the next generation, but multiplies it in ways that cannot easily be predicted.

Taken together, the persistence, the non-linearity and the time-delayed nature of climate change effects point to the disconcerting observation that at the time when humanity starts noticing negative effects, it is only the start of worse, and even unpredictable effects to come. Formulated in graphic terms: even if humanity was able to shut down all greenhouse gas emissions today, and even if levels of CO₂ in the atmosphere would thus stabilize in the future, the effects of past emissions would still be felt for centuries to come.

The ethical uncertainty that follows from these last-mentioned characteristics of global climate change lies in the question whether humanity is really ready to make the hard choices that will be required to mitigate greenhouse gas emissions, and to adapt to those effects of climate change that are unavoidable. Is humanity really able to visualize and imagine the challenges that it faces with regards to global climate change? And are the ethical guidelines currently available in the international sphere, adequate to help us make these decisions? In the sections that follow, a framework for a rational debate about these and related questions will be outlined. A first step in this direction will be an overview of the *basis, the nature, and the scope of ethics* in general. Then the ethical principles and guidelines will be discussed that already have substantive support in the international community, and have been captured in a number of normative documents, including international law.

3. Principles and guidelines available to ethics to address the uncertainties of climate change

Besides a special narrow notion of ethics as a part of philosophy, which provides a theoretical explanation and interpretation of morality, in a broad sense ethics, or morality, is commonly understood as knowledge of the fundamental values of human existence. Generally speaking, values are general apprehensions about the importance of objects (material or ideal, physical or spiritual) according to certain criteria. There are different kinds of values. For example, *instrumental values* mark objects, which are important for their usefulness in gaining other values. The extreme opposite of instrumental values are *intrinsic values*, which identify the importance of objects for their own sake. Environmentalists, developing a *non-anthropocentric* approach towards nature, animals, biosystems or ecosystems argue that these objects are valuable regardless of their usefulness to humans. The idea of intrinsic values has been proposed by philosophers, sometimes under the name of metaphysical values to identify essential qualities of objects constitutive of their being. *Ethical values* form the basis of decision-making and action in accordance with an ideal, accepted in a given moral system. They are expressed in the notions of good and evil, right and wrong, just and unjust, what deserves respect or not, etc.

In comparison with merely desirable things, situational, pragmatic, and prudential preferences, political convictions or instrumental values, ethical values are different by their *universalizable* character. Thus, decision-making and action on the basis of ethical values are not matters of arbitrary choice, but rather of following precepts that are of such importance that they are deemed to be binding on all rational human beings on earth. In comparison with aesthetical values, or judgments of taste, ethical values are distinguished by their *prescriptive* character. What makes ethical values different from all kinds of practical values, is their overriding character: they articulate an imperative or a

“must” that cannot be escaped if there is adherence to ethical values. Conversely, if the imperative or “must do” that follows from an ethical value is denied, then that value and its importance itself is denied. Such a denial however, is also not a matter of arbitrary choice. Following from the universalizable character of ethical values, when an ethical value and the imperatives following from it are denied, society has a legitimate expectation to insist that the dissenter provide a sound, *rational justification* for doing so, and if such a justification cannot be provided, to place some kind of sanction on the dissenter.

Ethical values are implemented into practice (individual or group behavior, corporate or public policies) through principles and rules, which together with values constitute an important part of ethics.

Among fundamental ethical values are:

- *the good* of individuals and communities,
- *solidarity* and *unity* between individuals and within communities,
- *virtues* (or character traits that typically enable rational agents to promote the good of individuals and communities, or solidarity and unity between individuals and within communities), and
- *excellence* in the good, solidarity, and virtues expressed in *moral ideals*.

Such values are promoted through ethical principles like:

- Do not cause harm,
- Contribute to the good of others,
- Be nonviolent and just,
- Be tolerant and respect the dignity of others.

A further characteristic of the ethical domain is that it primarily *deals* with *human agency*, that is: human action (including decision-making) and its effects. As such, the basis of the ethical domain is constituted by the ability of humans to freely and rationally choose between different value-laden options, and the expected consequences following from these choices. Accordingly, the ethical domain is not only circumscribed by the value choices made by humans, but also by the critical weighing of the expected consequences of their choices.

In this context, the ability to *freely choose* between value laden options again does not imply arbitrary choice. It rather entails freedom from coercion, i.e. freedom from external pressure that actually deny rational agents their ability to exercise their own judgment. Indeed, the ethical domain entails the freedom to independently form one’s own assessments on rational grounds alone with reference to the dictates and requirements of ethical values. From this it follows that the ethical domain allows for different interpretations of ethical values, but at the same time, when differences occur in this regard, it also lays down an imperative for those who differ from one another, to engage in a *rational debate* about their differences.

The importance of this rational debate is underlined by the fact that all ethical analyses, and the critical reflection associated with it, are always conducted in the *context of uncertainty*: the moral agent can never claim to have complete knowledge about a situation, or that all consequences of all actions in that situation are known or can be foreseen. Within such a context of uncertainty, no action and no decision is self-evident; on the contrary, from an ethical point of view *every* action and *every* decision made in the face of uncertainty ultimately requires a sound justification, and it is at this point that, rational ethical debate and critical ethical reflection can help to explicate and clarify the value basis of

actions and decisions, and to deepen insight into their expected consequences. Since there are numerous uncertainties with regards to global climate change in so far as that all of its causes, and all possible measures to mitigate or adapt to it are not known, an ethics of global climate change will have to explicitly deal with the complicating factor of uncertainty.

Having made these general observations about the basis, nature and scope of ethics, it is important to turn to the question whether it is at all *possible* to take ethical action in response to the challenges of global climate change. Part of the problem is that climate change can mistakenly be placed outside the realm of serious ethical consideration on the grounds that it entails an inevitable natural process that is unfolding in time, in which no human intervention can make any difference. As such, this argument goes, climate change falls outside the ambit of human agency.

However, even if some aspects of global climate change entail a chain of natural causes and effects, it has unequivocally been established by the authors of the *Fourth Assessment Report* of the IPCC that past and present human actions are an important contributing factor in this chain of events, and that even if some of the effects of global climate change are unavoidable, humanity can still mitigate some of these effects, and will have to adapt to those effects that it cannot avoid or mitigate. Indeed, even if the contribution of humanity to climate change is denied, adaptation to the effect of this process clearly falls within the sphere of human agency, and thus will require an ethical response. Thus, global climate change falls squarely within the domain of human agency, and so appropriate responses to its challenges will always entail serious decisions in terms of the values and principles discussed above.

4. Ethical principles and guidelines available to the international community to address the ethical issues related to climate change

A number of international documents exist that could be used to articulate the already existing international consensus on the ethical values that should inform our responses to global climate change. These documents include:

1. The Universal Declaration of Human Rights – the UDHR of 1948.
2. The Earth Charter.
3. The United Nations Framework Convention on Climate Change.
4. The United Nations Convention on Biological Diversity of 5 June 1992.
5. The UNESCO Declaration on the Responsibilities of the Present Generations Towards Future Generations of 12 November 1997.
6. The Kyoto Protocol.
7. The Universal Declaration on Bioethics and Human Rights (UDBHR).
8. The Johannesburg Declaration on Sustainable Development of 2002.

Against the background of the discussion in Section 2.3.1, it is important to note that each one of these documents is based on certain values and principles – for which there already exists universal support in the international arena. Accordingly, these values and principles could be explored with a view to determine their relevance and applicability to addressing ethical issues related to global climate change. It can be expected that the values and principles in these international documents may not be fully relevant or fully adequate to address the ethical issues related to climate change, so it will be expedient to identify where the gaps in these documents lie, and to aim future work on the ethics of climate change to fill these gaps.

Among these international documents, the following principles are expressed that are highly relevant to responding to the ethical challenges of climate change:

1. The right to life, liberty and personal security.
2. The right to a standard of living adequate for the health and well-being of people ... including food, clothing, housing and medical care.
3. A social and international order in which the rights and freedoms set forth in the UDHR can be fully realized.
4. The universal right to access the benefits of scientific progress (which implies the duty of sharing scientific data).

4.1 Problems in applying international instruments and principles

The problem with such human rights is that unless there are adequate enforcement methods, any assertion that these rights are “binding” are at best optimistic, and at worst misleading, as the recent ignoring of the right not to be tortured has illustrated.

However, the Universal Declaration of Human Rights (UDHR) put a duty on “every individual and every organ of society” “by progressive measures, national and international, to secure the universal and effective recognition and observance both among the peoples of Member States themselves and among the peoples of territories under their jurisdiction of these rights.” What is more, Art 28 specifies: “Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized.” This puts a binding obligation on the signatories to work towards such an order including one dealing with environmental threats to human rights.

In the preamble of the Universal Declaration on Bioethics and Human Rights (UDBHR) the General Assembly declares: “*Resolving* that it is necessary and timely for the international community to state universal principles that will provide a foundation for humanity’s response to the ever-increasing dilemmas and controversies that science and technology present for humankind **and for the environment,**” and specifically “recalls” *i.a.* the Universal Declaration of Human Rights of 10 December 1948 and “notes” a number of international documents, including the United Nations Convention on Biological Diversity of 5 June 1992 and the UNESCO Declaration on the Responsibilities of the Present Generations Towards Future Generations of 12 November 1997. In other words a number of principles and ethical norms from those documents, which have been internationally accepted, are being further endorsed. Among the aims of the declaration particularly relevant to the ethics of global climate change are the following:

1. To safeguard and promote the interests of the present and future generations;
2. To underline the importance of biodiversity and its conservation as a common concern of humankind.

If we consider the impact global climate change is predicted to have on the living standards, health, livelihood and even the life of populations who will be most vulnerable to the consequences of climate change, a good case can be made for a very strong moral duty, if not a legal obligation, for all signatories of the UDHR and UDBHR to put in place measures that will protect the human rights which the international community has accepted. This argument is being forcefully put forward by Pacific Islanders whose islands, or those of their neighbours, are likely to disappear under rising sea-levels.

There are two quite different problems involved in this regard:

1. How to get all states to co-operate in effectively limiting future greenhouse gas emissions so as to slow down, halt or even reverse global climate change. This is an urgent problem for the post-Kyoto period.
2. How to cope with the damage that is already happening and that is expected to increase before any measures to limit emissions can have a perceptible effect.

While a global, mandatory regime to limit emissions is logically the first step that needs to be put in place, it may be that international aid to flood, drought and storm victims is politically easier to organize, since the “wait and see” and “we won’t till all the others do” (i.e. conditionality) reasons for refusing to agree to binding global emission limits cannot be used as excuses for refusing humane aid when disasters strike. It may be that the increasing cost of such international aid, if climate change damage becomes more widespread and serious, will break down present day political resistance to a comprehensive international regime for emissions limitation based on economic considerations.

The particular problem whether future emissions allocations should be based on a per capita basis (as the contraction and convergence proposal suggests) or on a country basis, might be seen in a different light if humanitarian aid were internationally organized on a basis of each country’s ability to pay – i.e. the greater duty of rich countries to contribute to such aid might be politically easier to accept than more stringent emission limits imposed on “more polluting” and “past polluting” countries than LDCs (least developed countries), which would also cost “richer” countries more.

An even greater impetus to accepting mandatory emissions limits might arise in reluctant countries if the international community agreed that there was a legal obligation to accept climate change refugees in proportion to a country’s ability to support them. The prospect of having to accept thousands of immigrants from climate-change devastated countries might make accepting the economic loss from reduced emissions more politically acceptable. This is of course not an ethical, but a Real-political consideration.

Meanwhile the Earth Charter, UNFCCC and the Kyoto Protocol have articulated a number of principles and values which appear to be generally accepted, even if implementation is not. The Kyoto Protocol, which came into effect on February 2005, is an international and legally binding agreement to reduce greenhouse gas emissions for the period 2008-2012. It sets binding targets for 37 industrialized countries and the European Community under the principle of “common but differentiated responsibilities”. However, these countries can meet their targets by three market-based mechanisms: emission trading, clean development mechanisms, and joint implementation, which have caused a certain amount of criticism and political controversy. 182 Parties to the Convention have ratified the Kyoto Protocol to date and it could therefore be assumed that the principles and values set out in the UNFCCC and Kyoto Protocol have been widely accepted.

4.2 Drawing on already shared and accepted principles

There exist a number of already shared and accepted principles in the international arena that could also be drawn upon to provide elements of a value basis for an ethics of climate change. For reasons that are explained in section 3.3 below, no detailed definitions of each one of them (of which numerous

examples are available) will be provided here, nor will examples of specific applications of these principles in the context of climate change be provided here. Instead, only a list of these principles is given, that include:

- The precautionary principle.
- The principle of shared but differentiated responsibilities.
- The principle of safeguarding and promoting the interests of the present and future generations.
- The principle of protecting human rights.
- The principle of equitable access to medical, scientific and technological developments as well as the greatest possible flow and the rapid sharing of knowledge concerning those developments and the sharing of benefits, with particular attention to the needs of developing countries.
- Sustainability.

4.3 A response to the ethical challenges of climate change may entail more than just applying existing values and principles

There could be merit in questioning whether an ethics of climate change merely entailed applying existing principles to a new problem. There seems to be adequate grounds to suggest that we rethink the meaning and application of the ethical principles that we commonly use to make moral decisions. Lack of imagination and sensitivity to issues could be a part of these grounds. Another ground can be found in the challenge that global climate change poses to the very possibility of ethics (or: moral decision-making).

As it was suggested in the discussion of section 3 on the basis, nature, and scope of ethics, ethics presupposes human agency (or autonomy), i.e. the ability to act on foreknowledge about the effects of one's choices. This presupposes a rational subject with the ability to consider options in the light of fairly well-defined cause and effect relationships, as well as the freedom to choose between different options.

These presuppositions of ethics are clearly challenged by climate change. In the context of climate change, agency seems to be diffused; causes and effects seems to be dispersed and non-linear; while freedom and autonomy seems to be undermined by the fact that everyone's fate is determined by the choices that a multitude of others make. Projected to future generations, this problem deepens, since climate change starkly underlines that the well-being of future generations, human as well as non-human, are dependent on the choices that past generations have made.

Climate change thus seems to deeply challenge, and even destabilize the fundamental concepts and presuppositions we conventionally draw upon in moral decision-making. A word of caution is appropriate at this point, however, because the profound challenge that climate change poses to our fundamental moral concepts can create a sense of despair and resignation, and this can undermine our will to take international action in response to the problem-cluster that climate change constitutes. Instead, a more moderate response can be proposed, entailing an acknowledgement that the task of an ethics of climate change cannot be reduced to merely picking an ethical framework and a few fundamental principles and then merely applying them to a new problem. The task rather seems to lie at a deeper level, consisting of rethinking the manner in which we formulate and respond to problems and issues; rethinking the manner in which we draw upon the conventional values and principles of ethics.

As such, climate change provides us with an opportunity to rethink:

- Issues of responsibility and accountability;
- Human dignity – including the dignity of indigenous peoples (living, for example in the Arctic region, small islands, or in arid or semi-arid regions);
- National interests and identity;
- International cooperation and decision-making;
- Current views of minorities;
- Current views of resilience and vulnerability;
- How to handle differences of opinions in the international arena;
- The ownership of scientific knowledge, and the sharing of scientific data.

With this in mind, it can further be observed that the ethical challenge of climate change does not fundamentally lie in clashes between incompatible frameworks, but rather in creating an opportunity to establish a productive dialogue between nations and other relevant agents from which a new consensus may emerge about the issues listed immediately above. In the next section examples of six core themes that should form part of this dialogue are highlighted – not with a view to settling the issues, but rather to foreground their importance and to indicate why each of them deserve serious discussion in the context of developing ethically justifiable responses to the challenges of global climate change.

5. Core themes for critical dialogue in the context of developing ethically justifiable responses to the challenges of global climate change

If it is true that no-one has the final answer to deal with the challenges of global climate change, and if it is true that every agent attempting to respond to it is faced with the challenges of collective action and decision-making, complexity and uncertainty, it is perhaps a wise move not to make strong proposals about exactly what to do and how to act in the face of global climate change, but rather to raise a number of core themes and central questions that cluster around them that can enable us to engage with one another in a rational dialogue, and by doing that, can help us to move forward step by step and inch by inch towards finding adequate, practical, humane and ethical responses to the challenges of climate change. These core themes include the link between foreknowledge and the duty to act upon it, the place of human rights in an ethics of climate change, and the role that the precautionary principle can play in addressing the risks and uncertainties that an ethics of climate change is expected to respond to. Concerns about future generations in the context of global climate change should also be added to this list, as well as the effect on future generations of discounting in decision-making about present options. The general theme of collective and shared responsibility, and the many strategies that are commonly used to avoid action on climate change should also be foregrounded in these dialogues.

5.1 The link between foreknowledge and the duty to act on it

In ethics generally, the worth of actions and policies depends not only upon the values and principles they realize, but also upon their effects. An agent should thus foresee possible effects of his/her actions, and act to achieve the best results. In the context of an ethics of climate change this foreknowledge has to do with knowledge about the impact of collective human action on the global climate system, and the effects of changing this system for the worse. Thus at least three duties can be discerned:

- The duty to **actively pursue knowledge** on the impact of human action on the global climate system, as well as the impact of climate change on human activities, in particular those of people most vulnerable to climate change.
- The duty to **share that knowledge** when it is available.
- The duty to **act in a timely fashion and appropriately** on that knowledge.

Given the characteristics of global climate change discussed above, the identification of these duties raises the question of who should ultimately take responsibility for generating this knowledge – what kind of experts and which institutions should be involved, and how should they go about it? And if this knowledge is generated, further questions arise about who should take responsibility to disseminate and share it with others, and who should take responsibility to act on this knowledge?

An obvious starting place to answering these questions is to take a critical view of the current organization of science in the world, and to ask whether the typical research activities taking place, and the structures through which research is promoted, funded, published and further disseminated are optimally geared to enable humankind to understand, prevent, mitigate or adapt to climate change.

Another question that needs to be asked, is whether the questions that guide climate change scientists in their research, adequately reflect the information needs of those that are most vulnerable to the effects of climate change, and if not what can be done to make climate change science relevant to those who have immediate and short term knowledge needs to adapt to or avoid rapidly changing circumstances because of climate change? To illustrate this with a concrete example: Are polar scientists studying the formation, structure, movement, breaking up and melting of Arctic ice responsive to the knowledge needs of indigenous peoples living in the Arctic who experience in their daily lives that the ice on which they live are disappearing from underneath their feet and sense that they may not only lose their traditional livelihoods, but the very place in which they and their ancestors have lived for centuries? Are these polar scientists open to and responsive to the contributions that these indigenous peoples can make to their scientific research, and are they geared to engage with indigenous people with a view to learning from them, and vice versa, sharing their scientific knowledge with them in a manner that can benefit them.

Questions could also be asked about whether scientists from different parts of the world and from different nationalities are optimally geared to cooperate with one another, to share their observations and data with one another, and to jointly interpret that data to make it available in a format that is accessible to those that can act upon it. But are national governments and international scientific organizations making available resources and know-how to develop and implement science policies and systems that enable climate change scientists to form the networks that are required to build an adequate scientific knowledge base to understand, prevent, mitigate and adapt to global climate change? Are national governments and international educational organizations making appropriate arrangements to adequately prepare the next generation of climate change scientists, and is this done in a manner that prepare them to deal with complexity, uncertainty, and the integration of and mutual interaction between the natural, social, cultural, political, economical and ethical dimensions of global climate change?

5.2 Applying the precautionary principle as a basis for action in the face of scientific uncertainty

Scientific uncertainty as discussed in section 2.2 above clearly has far reaching implications for policy-making and action with regards to climate change, in particular for policy-making at a regional or national level. In this context, the question arises if it can reasonably be expected of national governments and regional institutions to allocate scarce resources to mitigate greenhouse gas emissions and make provision for adaptation strategies, if it is not certain whether mitigation at a local level will have any effect on global climate change, and if it is not certain whether the untenable scenarios will materialise that will require adaptation?

The short answer to this question, is found in the *precautionary principle* which, formulated in ordinary language, states that action to prevent serious harm to humans or the environment should not be postponed until rigorous scientific proof is established about the causes and effects of that harm. From a more comprehensive working definition of the principle that was prepared by COMEST in 2005, it is clear that scientific uncertainty in the context of risk and potential danger does not establish grounds for inaction, but rather for action, including an active pursuit of further knowledge about the risk or danger. For the sake of clarity, the complete formulation of this working defining is reproduced here:

When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm.

Morally unacceptable harm refers to harm to humans or the environment that is

- threatening to human life or health, or
- serious and effectively irreversible, or
- inequitable to present or future generations, or
- imposed without adequate consideration of the human rights of those affected.

The judgement of plausibility should be grounded in scientific analysis. Analysis should be ongoing so that chosen actions are subject to review. Uncertainty may apply to, but need not be limited to, causality or the bounds of the possible harm.

Actions are interventions that are undertaken before harm occurs that seek to avoid or diminish the harm. Actions should be chosen that are proportional to the seriousness of the potential harm, with consideration of their positive and negative consequences, and with an assessment of the moral implications of both action and inaction. The choice of action should be the result of a participatory process. (COMEST 2005:14)

What we already know beyond reasonable doubt and with scientific plausibility about global climate change is that it poses a morally unacceptable harm that is uncertain only in terms of magnitude and timing, not that it will take place. So, in terms of this working definition, humanity cannot use uncertainty as grounds for inaction with regards to global climate change. On the contrary, the very uncertainty around global climate change in the first place constitutes an imperative to be taken up by the scientific community to study climate change in a focussed and in-depth a manner as is possible to resolve any uncertainties that can be resolved, with a view to form a better understanding of the morally unacceptable threats and risks that can materialize. This, however, cannot be

done without, at the same time, also studying the extent to which people and the environment are vulnerable to these threats and risks, what the basis of their vulnerabilities are, and whether the capacity exist among them to adapt to these threats and risks if they materialize. An assessment of measures to reduce vulnerabilities and to build the capacity to adapt if it is absent, will clearly be required to complete the picture.

Responding to uncertain risks in this manner, the precautionary principle implies a second imperative, to be taken up by governance bodies at a regional, national and local level to put in place structures and procedures that are resilient and can formulate policies, strategies and plans that are robust in character – i.e. policies, strategies and plans that are sensitive to the vulnerabilities of people and the environment, and will stand up against any over- or underestimations of the risks in question. Resilient structures would entail the ability to withstand shocks, the ability to learn from experience, as well as self-organization. As such, the precautionary principle implies an active, system-wide, collective response in which scientists, policy-makers, businesses, NGOs, and the public work together in innovative networks to mobilise scientific and all other forms of knowledge to develop new technologies and organisational forms to face the risks of climate change and adapt to its challenges. Exactly how to form these resilient structures and these robust policies is of course a challenge that need to be tackled on a case by case basis with patience, modesty and determination. The merit of the precautionary principle and the cautious approach sketched above, as proposed by COMEST in its publication of 2005, is clearly a theme that deserves thorough discussion and further exploration within the context of our responses to global climate change.

5.3 Determining the place of human rights in an ethics of climate change

One of the important issues that need to be addressed in an ethics of climate change is the impact of climate change and its effects on human rights, as well as the question whether the measures that nations and international organizations may need to take with a view to adequately respond to the challenges of climate change, could ever justify a weakening of the human rights currently guaranteed by the Universal Declaration of Human Rights, and if so, under which conditions and to what extent. The converse of this question is whether those vulnerable to climate change can appeal to the UDHR in an attempt to stop others from actions or inactions that cause or exacerbate climate change and its effects, or even claim compensation from those that have caused climate change. Related to this is the question whether victims of climate change can appeal to their human rights with a view to be accommodated in another country in the case of their own country, or parts of it, becoming uninhabitable.

There also seems to be good reasons to question whether a focus on human rights will really enable us to address the ethical issues around climate change. Arguably, it is individual human and public interests rather than rights that we should focus on or give priority to in an ethics of climate change; so, perhaps human rights language should not be given a blanket priority in decision-making about responses to climate change, since circumstances can arise in which the immediate needs of victims of extreme weather or climate events, or those most vulnerable to climate change trends, can trump many claims to human rights. To determine when circumstances like these have indeed arisen, is clearly an issue that cannot be settled in advance in theory, but rather require a thorough case-by-case analysis.

5.4 Concerns about future generations in an ethics of climate change

It goes without saying that concerns about global climate change entail concerns about impacts on future generations, including distant future generations. Some climate change models predict a rise in average temperatures and sea levels that may continue over a thousand years. Similarly, concerns about sustainability and sustainable development entail concerns about future generations. In the widely accepted definition of the Brundtland Report (*Our Common Future*) of 1987, sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

The ethical concern about future generations turns around the ability of present generations to harm future generations in the sense of leaving them with less resources or opportunities than the present generation is enjoying, or with more burdens and risks to deal with. The present generation is always in a position to close down options that the future generation may otherwise have had. It is obviously unacceptable to put a future generation in a position to make tragic choices that it otherwise may not have taken. The present generation, for instance, can compromise the position of a next generation to such an extent, that in order to save itself, it may inflict even more harm to a succeeding generation, which seems to be fundamentally unfair, since it can do nothing about the position it has inherited from the decision-making and policies of a previous generation.

The troublesome condition of the present generation with regards to any future generation at a remove of more than three, is that it always already finds itself in a unilateral position: it is always in a position to act with impunity, since there is no basis for reciprocity from those future generations. Reciprocity, however, is a central presupposition of the well-established deontological-Kantian, utilitarian, or contractarian frameworks for moral decision-making. The conditions for the Golden Rule test which states in its more acceptable negative form that we should not do to others as we do not wish them to do to us, thus seem to be impossible to satisfy over the divide of four generations. Reciprocity is ruled out in advance.

The same applies if we revert to the language of harm, or rights or needs to conceptualize our moral relation with future generations: a future generation that does not overlap with ours, cannot hold us accountable and claim compensation from us, or exercise any rights with reference to us, because when they do so, we do not exist any more. To some extent, they may also have different higher level needs than we do, although their basic subsistence needs may be the same as ours. However, instead of thinking about an infinite number of future generations with all the theoretical difficulties⁷ that entails, we should as a starting point consider that a child born in 2009 may, if the present increase in life expectancy continues, be alive well into 2100 (when some of the catastrophic predicted effects of climate change have taken effect), having by then had children and grandchildren. For these three future generations the problems about reciprocity and inability to foresee needs may not apply.

It may be legitimately objected that concerns about future impacts in the relatively short time frame of a 100 years may not rise to the challenge of making any real difference to the longer term or catastrophic effects of climate change. However,

⁷ See Parfit (1983, 1985 and 1997) for an overview of the theoretical difficulties posed by a moral consideration of future generations.

this smaller time frame makes it possible for us to think of future people in terms of interests and needs and harms that we still can imagine and realistically respond to, and it enables us to think of them as holders of rights and claims that we can support, negotiate about or even plan for in the present. With this approach, we then effectively place ourselves in a position of “reciprocating in advance” or “reciprocating in anticipation” which at the same time entails opening ourselves up towards, on the one hand, the future with a projection of an anticipated responsible action, and on the other hand towards the possibility of being corrected by what actually unfolds in the future. The fact of the matter is that we may be partially or totally wrong in our projections of possible future responsible actions in support of the third or the fourth future generation – which does not take away that the present generation has a clear duty to ensure, in the light of what it knows about future climate change, that its current policies are as robust as is reasonably possible in its consideration of immediate next generations.

As such, the consideration of future generations seems to be an essential element of an ethical response to the challenges of climate change. It opens us up to consider wider interests than that of the present generation alone, and it moderates the claims we tend to make about the “solutions” we have found in our time to the challenges of climate change. New scientific knowledge of a next generation may unmask our “grand insights” at best as only partially valid, and at worst as totally misguided. In terms of the “modest approach” to climate change challenges that is unfolding here, this is not a cause for despair and resignation, but rather a call to be sensitive to new insights, to learn from other perspectives, and even to discard our own cherished views if other arguments turn out to be more convincing than ours, if other models and theories explain more and predict with more accuracy over longer time spans than we were able to do till now.

5.5 *Concerns about discounting*

In decision analysis, the usual technical expression of concern for the welfare of our future selves or of future generations is discounting, whereby the present weight of future values decays exponentially over time at a constant discount rate. While discounting is a mechanical procedure once the discount rate has been chosen, the choice of the rate raises significant ethical questions.

As COMEST (2005) has emphasized in its work on the precautionary principle, the effect of discounting at significantly positive rates is to render present decision-making indifferent to very long-term consequences. A cost of 1 US\$ in 2100 has a present value of 0.1 cent if discounted at 8%, 1 cent if discounted at 5%, and only 17 cents if discounted at 2%, a rate much lower than typically considered in social decision-making on issues such as climate change. What this means is not simply that future costs and benefits have comparatively little weight in the economic balance, but furthermore that, for any discount rate greater than about 4%, it is unreasonable to seek to determine them with any precision. It is this principle of indifference built into the use of high positive discount rates that clashes with a basic requirement of intergenerational equity.

With respect to the long-range consequences of climate change, it is therefore ethically imperative to consider with care how to weigh future costs and benefits and to devote serious attention to assessing them. The issue here is not to reject discounting – after all a discount rate of 0 is still a discount rate – but rather to interpret it in ethical terms. First, what does a discount rate *mean*? Secondly, which *rate* makes ethical sense?

In economic terms, the discount rate corresponds to the *opportunity cost of capital*. Intuitively, it captures the notion of a “rate of return” that connects the past to the future by measuring, effectively, the capacity of a future balance sheet to cope with costs when they occur. Extension to *social* decision-making implies the notion of a “social rate of return” expressing the change over time of the total economic, social, human and natural capital stock of a society. Technically and ethically, the discount rate used for calculations about climate change mitigation or adaptation policies thus constitutes an assessment about the capacity of future decision-makers to cope with their problems – including of course the ones we bequeath to them.

Any assumption about the social rate of return over long periods is open to question, not just because of the uncertainties inherent in the dynamic of global climate change but also because present decision-makers need to remain open to the possibility that future decision-makers may value components of the capital stock very differently. Intergenerational equity, as emphasized in the COMEST report on the precautionary principle, cannot be limited to our concern for the future in our terms, but also for our sensitivity to what future generations themselves may care about. It is the unavailability of precise knowledge in this respect that dictates prudence about acting on the basis of discounted income streams, however precise and sophisticated may be their content.

No abstract ethical procedure can provide a definite answer to the question what discount rate should be adopted for calculations to inform decisions about global change. On the other hand, some fairly precise negative statements can easily be justified. Certain kinds of discount rate, including some commonly used in public debate, are manifestly inappropriate.

First, any discount rate higher than assumed future average GDP growth is clearly overstated. The *highest* plausible social discount rates therefore probably fall in the range of 3 to 5%. Secondly, GDP growth is a proxy for aggregate capital change, not a measure of it. It is well known that, in some respects, standard measures of GDP *underestimate* growth by failing to account fully for technical change. It is equally well known that, by failing to account for destruction of natural capital and other non-market effects, such measures *overestimate* growth. How these opposite effects balance out is controversial. Given the possibility that climate change might cause unprecedented loss of natural capital, it at least deserves consideration whether a reasonable long-range social discount rate should not be lower than a consensus estimate of average future GDP growth, over and above the effect of climate change on growth as conventionally measured by GDP. Anything else would simply transfer the risk of climate change entirely to future generations.

Indeed, even the possibility of a *negative* social discount rate should not be rejected out of hand. Before sticking to a range of positive values, one should at least be convinced that future generations will be at least as well equipped as we are to deal with climate change, taking account of the possibly irreversible consequences of our present choices and of the possibly different values with which they may approach them.

5.6 *Obstacles in the way of sharing and differentiating responsibilities*

One of the core themes that need serious discussion in an ethics of climate change, is the obstacles in the way of realizing the principle of “common but differentiated responsibilities” in tackling the causes and effects of global climate change. This principle is clearly articulated in the Kyoto Protocol, and

acknowledges that the actual ability to take action to address the knowledge, mitigation, and adaptation challenges of global climate change, varies from country to country, and from region to region. Within countries, there are similar differences between parts of the population that can take action in the face of climate change challenges, and other parts that cannot.

From an ethical point of view, it is a well-established principle that there rests a clear duty on those who have the ability to prevent or alleviate harm suffered by others, and are in a position to exercise that ability without sacrificing a greater value than what is rescued, to assist those who are, or will be suffering from that harm. For example: it would not be reasonable of us to expect someone who cannot swim to rescue a child that is drowning in the heavy swells of a rough sea. However, we will find it ethically reprehensible if a well-trained lifeguard who knows how to brave such conditions and has the equipment to do so, would refuse to come to the rescue of the child and merely stand by as the child drowns. He would have to provide very good reasons before we would take his inaction as ethically acceptable. We would find it equally reprehensible if the life saver did not act on the grounds that (a) he waited for better equipment to arrive, (b) that he would comprimize his economic position by being late for his night job, or (c) that he would not take action unless someone else assisted him.

By way of this example, attention can be drawn to three of the arguments that are often offered as justification for inaction by those agents who are able to act on the challenges of global climate change, but choose not to do so. One is the argument that such action may cause damage to national economies. Another is the argument that we have to wait for new technologies to mature. And the third one displaying the classic structure of the prisoner's dilemma is the conditionality argument: I will not act alone; I will only act in concert with others, and for that matter, only if we all act together.

It is not necessary to explain these arguments in more detail, except to point out that acknowledging their existence and assessing their functioning in decision-making (or lack thereof) about the action that should be taken to address the challenges of global climate change, should be central in the dialogues that we need to have with one another to determine what our ethically justifiable options are when we have to decide what to do, and whom to assist when global climate change literally or metaphorically leads to people drowning (or dying from drought, for that matter). If these arguments merely serve as excuses for inaction, i.e. to not build a solid base of scientific knowledge to understand the causes and effects of climate change, to pay little if any attention to mitigate the intensity of climate change, or to do nothing with regards to adapting to the unavoidable effects of climate change then big ethical question marks need to be placed behind the utilization of these arguments.

6. Conclusions

6.1 Global climate change itself constitutes an ethical challenge

While acknowledging that there is a wide range of ethical issues related to the effects of climate change that each requires a specific response, there also seems to be a widespread international consensus that climate change in itself constitutes an ethical challenge that requires a collective response from everyone that contributes to causing it. As it is articulated in the documents of the IPCC and in the deliberations of the Conference of the Parties to the UNFCCC, the shortest way to articulate this "general" ethical challenge is to state that:

1. Climate change through global warming is caused, or at least contributed to, by human activity.
2. Climate change has already caused harm to human and non-human populations alike, and this harm is likely to increase as climate change intensifies – as it is expected to do for some time still.
3. Since climate change is caused by global warming (rising average temperatures of the sea and the earth's atmosphere), and since global warming is in its turn caused by emissions of greenhouse gases (including carbon dioxide and methane), it is generally accepted that climate change can be arrested, mitigated and even reversed if optimal levels of additional anthropogenic greenhouse gas emissions can be established and enforced.
4. Since past emissions of greenhouse gas emissions have already brought about unavoidable climate change effects, international action should also focus on adaptation to long term climate change trends, as well as immediate disaster aid in response to extreme weather events caused by climate change.

Seen from the point of view of this consensus, there seems to be a duty resting on individual, corporate, national and international agents to ensure that they do not (further) contribute to causing climate change, but rather contribute towards reversing it – in particular, to take measures, on the one hand, to mitigate greenhouse gas emissions, and on the other hand, to put measures in place that will facilitate effective adaptation to those effects of climate change that cannot be mitigated, and will continue to be felt until such time that the measures to reverse climate change take effect. Following from this, there also seems to be a duty on everyone who can contribute to mitigation and adaptation, to assist those who have, or will become victims of climate change but cannot help themselves.

While, from an ethical point of view, mitigation and adaptation are equally important tasks, it is crucial to note that the international community has up till now focused mostly on mitigation, giving adaptation a secondary status. However, taking into account the long time spans required for mitigation measures to take their effect, and given that many of the processes contributing to climate change are persistent and that many of its effects are irreversible, the question arises whether the international community should not shift its priorities to adaptation measures – while continuing with its efforts regarding mitigation. .

Formulated thus, this general response to climate change seems to be justified and reasonable, and therefore something that cannot be easily dismissed or rejected. The trouble, however, is that this consensus is challenged from various angles from outside and within.

From within the general consensus around what should be done about climate change, there seems to be disagreement on, for example, the following issues:

1. The rise in the average temperature of the earth that can be allowed before a tipping point is reached after which catastrophic climate change will be irreversible. (Some argue that we have a margin of 2 degrees centigrade above the average temperature of the pre-industrial era, others argue that the margin is 4 degrees, while others point out that even a 2 degree rise in average temperature will have catastrophic effects for populations living on small islands, large river deltas, or other low lying areas.)
2. The time frames within which we have to reverse the general trend of rising average temperatures. (Some set 2050 as the target date, while others argue for a longer or shorter timeframe.)
3. The ceiling that should be set for greenhouse gas emissions. (On the one hand, some propose that optimal levels of emissions will require a

reversal of emission levels to that of 1990, while others propose a return to emission levels of 2000; on the other hand, some propose that current emission levels can be doubled with no serious detrimental effects, while others still argue that no ceiling should be set because market forces will ensure optimal levels of emissions at the best possible trade-off between costs and benefits to society.)⁸

4. The question whether the solution is to be found in neutralizing current levels of greenhouse gas emissions by offsets, such as tree planting, or by replacing old with new technologies, or by doing both. (Some argue that a state of zero emissions can be reached by neutralizing or offsetting emissions through biological and technological means; while others argue that a state of negative emissions can be provided when more offsets are put in place than is required to neutralize emissions.)
5. The question whether the solution is to be found in lowering current levels of greenhouse gas emissions, or finding more efficient levels by sequestering emissions. (Some argue that we need a drastic change of lifestyle and character to ensure lower levels of emissions, while others say that we can continue with our current consumerist lifestyles if we can find ways to prevent, for example, carbon emissions to reach the atmosphere.)

From without, the general consensus sketched above is challenged on the basis of:

1. Skepticism about the causes of climate change, in particular the claim that current climate change is human-induced. (This implies that nothing should be done about climate change, because nothing can be done about climate change; it should be left to take its natural course, and the most humans can hope for, are effective measures to adapt to its effects.)
2. Skepticism about the effectiveness of fighting climate change by reducing CO₂ emissions. (While accepting that climate change is caused by human activities, the argument in this regard is that most of the measures taken to cut current levels of CO₂ will have little if any effects, and that the finances required to achieve these cuts, could be used more effectively to address other world problems like eradicating poverty, or fighting a pandemic like malaria (see the arguments of Bjorn Lomborg 1998, 2004, 2008). While this challenge is important as a reminder that resources should be used efficiently, even when it comes to addressing the causes and effects of global climate change, it can be questioned on the basis of its extremely narrow methodology of financial cost-benefit analysis in which there is no place for other than monetary values. Against the background of the discussion of the precautionary principle above, it is also highly questionable to channel money away from mitigation and adaptation measures if it is scientifically plausible that the threat of global climate change will produce morally unacceptable harm.)

While it may seem as if these challenges from within and from outside the ethical consensus sketched above is detrimental to this consensus, a closer look reveals that these differences of opinion for the most part do not deny that global climate change poses a serious ethical problem, and that action should be taken to do

⁸ The extreme suggestion that emission levels should be reversed to that of pre-industrial times is based on the assumption that any interference with the climate system of the earth is unacceptable. This is clearly a problematic position, because it will deny humankind all of the benefits that have been brought about by industrial activity. A more realistic position accepts that the survival and flourishing of humankind is compatible with some interference with the earth's climate system, as long as this interference does not lead to upsetting the climate system.

something about it. As such, these differences of opinion relate to the question *what* action should be taken, and *how* it should be executed. As to the question how these differences should be settled, the considerations discussed in this report suggest that a process of rational dialogue with reference to ethical values should be followed on a case by case basis, rather than formulating prescriptions based on fixed points of departure that are not open for discussion.

6.2 *There is not a single basis for an ethical response to the challenges of global climate change, but many*

There is a certain seduction in the notion of finding a single basis or point of departure for all ethical action. Such a point of reference can make one's life easy in many respects, one of which is that there is always a priority principle available to settle differences. Another advantage is that it results in a coherent set of beliefs, providing a framework in which decision-making and action can take place in a relatively uncomplicated fashion. However, this approach is too simplistic. It does not take into account that many values can be relevant to a situation, and that different values can point to different courses of action in the same context. It also tends to reduce moral decision-making to a matter of calculation, instead of deeply engaging with the issues and questions and challenges of a situation, and slowly sorting out what to do in dialogue with others.

Within the context of this report, it has been suggested, and can now be explicitly stated, that there is not a single basis for ethical action in the face of the challenges of global climate change, but many. This directly follows from the complexity of global climate change as a phenomenon unfolding in time. It also follows from the fact that different actions are required by different agents in different contexts to appropriately, humanely, and ethically respond to the challenges of climate change. For instance:

- The disaster managers of a nation or a region, who have to engage in contingency planning to address the challenge of people becoming victims of extremely intense storms, may choose a language based on the value of *immediate need* (or preventing harm) to respond to the challenge.
- A minister of science of a country, who has to decide which research programmes should be funded, may, on the basis of the *medium term needs* of the country's poorer population to adapt to rising sea levels flooding a large river delta, choose to support research that focuses on mass migration patterns and alternative settlement needs.
- A scientist (for example a geo-hydrologist) who has to determine which questions should inform his research design, may perhaps consider a wide array of options, and eventually choose those questions that serve the *information needs* of a population that is struggling to find adequate deposits of ground water for their livestock.
- A Pacific island population, who have to abandon their land and find alternative land to permanently settle on, could be expected at the same time appeal to the ethical values of *immediate need*, *solidarity* with fellow human beings, and *special obligations* stemming from having contributed in the past to the *causes* of climate change.
- A botanist studying a certain plant on the highlands of central Africa may stumble inadvertently on the discovery of a population of malaria mosquitoes where they never could have existed before because of rising average temperatures, may choose in spite of disciplinary boundaries to inform local, national and international health organizations about this, acting thus with reference to the *duty of acting on the basis of foreknowledge*, as well as the *duty to share knowledge* about matters that can detrimentally affect others.

These examples illustrate that an ethics of climate change is in actual fact not a field of investigation separate from and over and above the phenomenon itself and the actions taken in response to it. An ethics of climate change is rather part and parcel of every bit of knowledge gathered about climate change trends, their causes and effects, and every single decision and action based on that knowledge with a view to mitigate or adapt to particular effects of it.

Climate change ethics is thus not something added on top of other issues related to climate change; it is rather a constitutive part of all of the reasonably justifiable responses to the challenges of climate change. Therefore, it can be stated unequivocally that climate change cannot be dealt with adequately and properly if the ethical dimensions discussed in this report are not highlighted, well understood, and taken into account in decisions made about responses. The purpose of this report was therefore not to make climate change a (new) theme of ethics, but rather to make ethics a core and necessary element of all and any debate about climate change and its challenges.

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