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Negotiations**

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# AN “IDEAL” NORMATIVE THEORY FOR GREENHOUSE NEGOTIATIONS?<sup>1</sup>

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## INTRODUCTION

By the end of the 1980s public opinion became aware of the possible threat of global climate change caused by the so-called *greenhouse effect*. Researchers of different scientific disciplines started warning that the increasing emissions of greenhouse gases like for instance carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) might cause irreversible changes to the global climate system in the future. If nothing is undertaken to curb greenhouse gas emissions today, global climate change might place a considerable burden upon future generations, especially in developing countries. In the first section we review some of the scientific evidence for past and projected future climate change. The emphasis will be on the extreme long-term perspective of the greenhouse problem. As such, the greenhouse problem definitely classifies as a “time bomb” which is passed on from the current generation to many generations to come. We also address the issue of the distribution of the cost of climate change adaptation and mitigation strategies and review the current status of the international climate policy negotiations, in particular the ratification status of the 1997 Kyoto Protocol. Section two concentrates on a normative framework for the greenhouse problem and analyzes this from an ‘ideal’ (cf. Rawls) point of view. We shall defend in this section our preferential option for the poor and develop a welfare-theoretic framework that starts from the preference option for the poor and is close in spirit to the Rawlsian difference principle. Within this framework, arguments of historic responsibility and past emissions cannot be used as basis for the distribution of climate change mitigation or adaptation efforts.

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<sup>1</sup> This contribution is an update of Schokkaert and Eyckmans (1999).

## 1. ON THE NATURE OF THE GREENHOUSE EFFECT

Although there still exists a great deal of scientific uncertainty concerning the timing and regional impact of the greenhouse effect, most scientists agree (i) that the Earth's climate has already changed demonstrably since pre-industrial era, (ii) that this observed change is, at least partly, attributable to increased human activity, and, (iii) that more global warming is likely to occur if current technological, economic and demographic trends persist into the future. The following quotes from the Third Assessment Report (TAR) of the Intergovernmental Panel on Climate Change<sup>2</sup> (IPCC) confirm these three statements.

*“The Earth’s climate system has demonstrably changed on both global and regional scale since the pre-industrial era, with some of these changes attributable to human activities.”*

(IPCC, 2001, p.4)

*“Carbon dioxide concentrations, globally averaged surface temperature, and sea level are projected to increase under all IPCC emission scenarios during the 21st century.”*

(IPCC, 2001, p.8)

This enhanced greenhouse effect is believed to be harmful in the long term, especially for developing countries since

*“The impact of climate change will fall disproportionately upon the developing countries and the poor persons within all countries, and thereby exacerbate inequities in health status and access to adequate food, clean water, and other resources.”*

(IPCC, 2001, p.12)

The latter quote illustrates already one of the main points we want to make in this section: the projected future climate change is mainly a problem of distributive justice, both within and over generations. Before arguing in detail on the distributive aspects of global climate change, we will sketch briefly the main arguments of the scientific debate.

### 1.1 Natural versus enhanced greenhouse effect

Scientifically, the natural greenhouse effect is a well-understood and generally accepted climatic phenomenon. It was described already a century ago by the Swedish scientist Arrhenius and it is believed that in the absence of a natural greenhouse effect mean global temperature would be some 30°C lower than it is today, Cline (1991). The incoming sunlight arriving at the edge of the atmosphere is partly reflected by clouds, oceans, snow, ice, etc. The remaining short wave radiation reaches the surface of the Earth and warms the soil. As a result the warm surface of the Earth emits long wave infrared energy.

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<sup>2</sup> IPCC stands for the Intergovernmental Panel on Climate Change and was established by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988. The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation (<http://www.ipcc.ch>).

Greenhouse gases (GHGs) like water vapour, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), tropospheric ozone (O<sub>3</sub>) and chlorofluorocarbons (CFCs) allow the incoming short wave sunlight to reach the surface of the Earth but they absorb a considerable amount of the outgoing long wave infrared energy. These trace gases act like a blanket and trap heat at the surface of the Earth just like glass traps heat in a greenhouse.

During the last decades scientists discovered in data from different sample points a continuously rising trend in the atmospheric concentration of the main greenhouse gases and a small increase in global mean temperature (see next section for more details). Increased human activity since the industrial revolution is responsible for substantial annual emissions of mainly carbon dioxide, methane and nitrous oxide which are believed to add to the natural atmospheric stock of these gases. This anthropogenic increase in concentrations of greenhouse gases causes concern among scientists because it might enhance the natural greenhouse effect beyond its natural extent and might lead to global warming and disturb the Earth's climate equilibrium.

### *1.2 Is the greenhouse effect already observable?*

After every heat wave or hot summer, the media rediscover the phenomenon of the enhanced greenhouse effect. Alarming stories about the fate of our planet Earth are selling better during heat waves than during cold winter months. However, statistically speaking, one should be very careful in making conclusions based on only a handful of extreme observations. Nonetheless, the latest IPCC Third Assessment Report (TAR in the sequel) states very affirmatively the following conclusions with respect to observed changes in the Earth's climate and its driving forces.

First, the global average surface temperature has indeed increased from the 1860s to the year 2000, the period of instrumental record of temperature by means of thermometers. Over the 20<sup>th</sup> century, the increase was 0.6°C with a very likely<sup>3</sup> confidence range of 0.4-0.8°C. This is illustrated in Figure 1 that represents departures in temperature from the 1961-1990 average for the past 140 years. The Earth's surface temperature shows a clear upward trend over this period. Remarkably, most of the increase is situated in the last decade, the 1990s. IPCC argues that: "*Globally, it is very likely that the 1990s was the warmest decade, and 1998 the warmest year, in the instrumental record (1861-2000)*" (IPCC, 2001, p.4).

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<sup>3</sup> Very likely is defined in the IPCC (2001) TAR as a 90 to 99% chance that a result is true (Box 2-1, page 44).

Figure 1: Variations in the Earth's surface temperature for the past 140 years

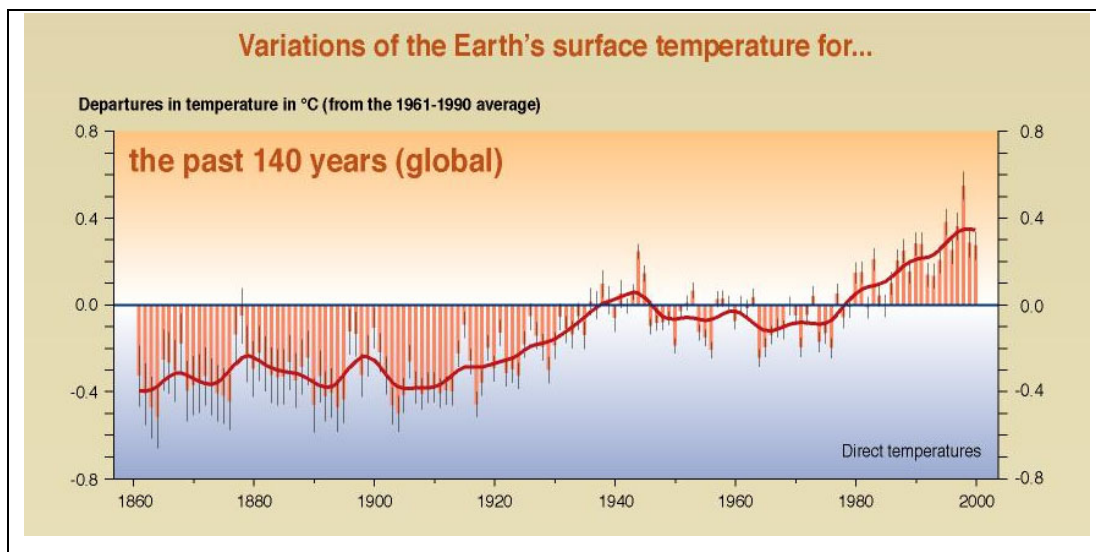


Figure taken from IPCC (2001), Figure 2-3, p.49

In addition the IPCC TAR states that “[...] *most of the observed warming observed over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations*” (IPCC, 2001, p.51). Figure 2 illustrates the increase over the last 1000 years in the atmospheric carbon dioxide concentration. The symbols refer to data taken from air bubbles trapped in ice. The continuous solid line refers to atmospheric observations from recent decades. Carbon dioxide is by far the most important greenhouse gas (GHG). Notice its atmospheric concentration was quite stable for several centuries but starts to increase sharply at the beginning of the industrial era. Exactly the point in time when anthropogenic emissions<sup>4</sup> of carbon dioxide started to increase rapidly as a result of the introduction of fossil fuels (wood, coal, gas and oil) to fire steam engines and, somewhat later, combustion motors.

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<sup>4</sup> Emissions are the annual release of these gases into the atmosphere (flow variable), whereas concentrations refer to the stock of these gases in the atmosphere (stock variable). The annual change in atmospheric greenhouse gas concentration is given by a fraction of the annual emissions (the so-called “airborne fraction”) minus the natural decay of the concentrations.

Figure 2: Atmospheric carbon dioxide concentration over the last 1000 years

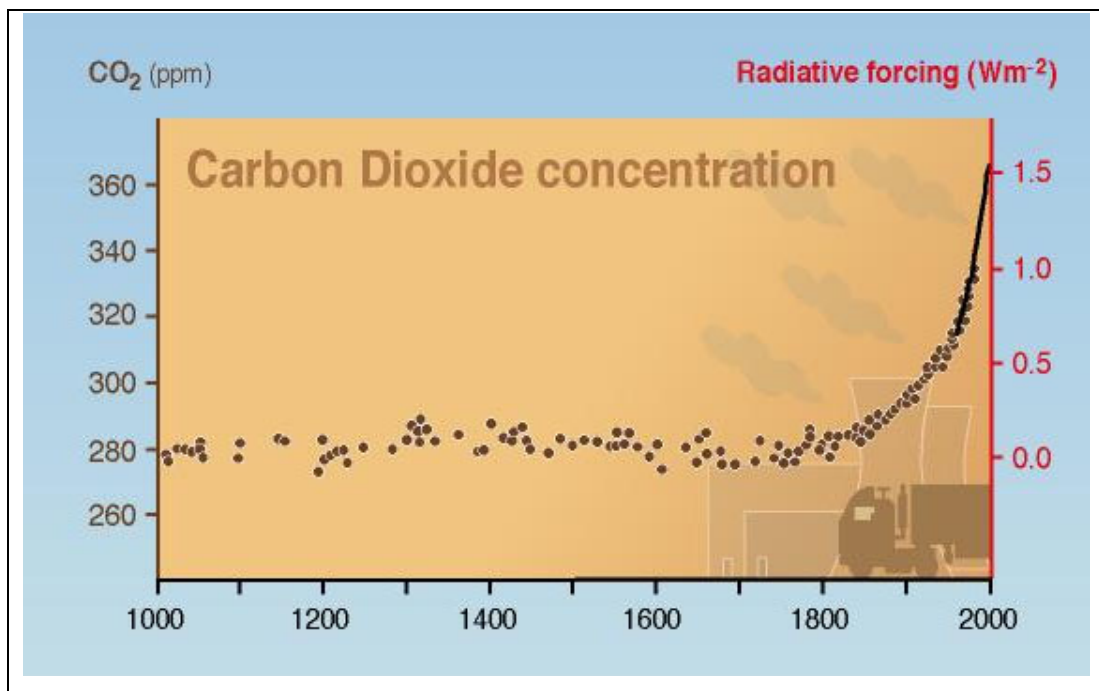


Figure taken from IPCC (2001), Figure 2-1, p. 47

Of course, the fact that there is a striking coincidence between observed warming and increased atmospheric concentrations and annual emissions of greenhouse gases does not constitute a proof for the thesis that increased human activity is to blame for climate change. It is well known that many natural effects like variations in solar activity, volcanic eruptions etc can also lead to variations in the Earth's climate. However, on top of these natural factors, IPCC TAR concludes that human activity is partly responsible for the observed (and projected) global warming (see first quote from IPCC TAR higher).

### *1.3 Physical and economic effects of future climate change*

But what about the future? IPCC latest assessment estimates that by the year 2100, global mean temperature will increase by 1.4 to 5.8°C, IPCC (2001). The wide range of this estimate is due to the fact that it is an envelop of estimates for different scenarios with respect to future development of greenhouse gas emissions and for different simulation models. Because of strong regional differences it is difficult to assess the physical effects caused by a rise in mean global temperature. If ocean currents start to shift local climate conditions might in fact become colder as a result of global warming. Therefore, the projected increase in average temperature is to be interpreted as an overall index of the severity of the greenhouse effect but one should realise that it might hide a huge variance in regional effects.

A first important consequence of global warming is the projected *rise of the sea level* caused mainly by the thermal expansion of the oceans and, to a lesser extent, by the

melting of ice and snow masses. IPCC (2001) says in this respect: “*Global mean sea level is projected to rise by 0.09 to 0.88m between the years 1990 and 2100 [...]*” (IPCC, 2001, p.64). Again, the global average is misleading since regionally, sea level rise might be higher or lower than the mean because of differences in air pressure, ocean depth or geophysical characteristics. A one-metre sea level rise could potentially affect three percent of the land area on Earth and one third of all agricultural cropland. Because much of this threatened land is densely populated and includes major cities, one billion people might be at risk according to Hekstra (1989). Among the most affected river basins Cline (1991) cites the Nile in Egypt, the Ganges in Bangladesh, the Yangtze and Hwang Ho in China, the Mekong in Vietnam, the Indus in Pakistan, the Niger in Nigeria, the Parana, Magdalena, Orinoco and Amazon in South America, the Mississippi in the US and the Po in Italy. Also the historic city of Venice and island states like the Maldives, Kiribati and Seychelles will have to invest heavily in additional coastal defences.

A second direct effect of global warming concerns *agriculture*. Already a small global mean temperature increase is expected to change ocean and wind currents drastically causing major shifts in day-to-day weather conditions. This will alter temperature, precipitation, soil moisture, and runoffs in many rivers and can have a great impact on agriculture. For the world as a whole, it is believed that climate change in the next century will affect agriculture negatively but not too badly. Some offsetting effect is expected from carbon fertilization which stimulates photosynthesis and from crop adaptation based on agricultural research. Regionally however, there might exist substantial differences.

A third effect of climate change concerns *vegetation and wildlife*. In general one can say that very little is known of the damage to ecosystems caused by global warming. A study of the Environmental Protection Agency, quoted by Cline (1991), suggests that substantial areas of forest might be lost if CO<sub>2</sub> concentrations were to double. Trees are able to migrate at presumably 50 to 100 km per century but this will prove too slow in order to keep up with a temperature rise which occurs at a rate of for instance 0.3 C per decade.

Fourthly, it is expected that global warming would increase the probability and intensity of *extreme climate events* like severe storms and floods. The ocean area, warm enough to generate tropical hurricanes, is likely to expand and these storms might become more intense since the difference in sea surface temperature between the equator and the poles is projected to increase. The IPCC Report (2001) is careful in its conclusions concerning storms. It warns that abrupt non-linear changes might occur but that there is an incomplete understanding of the underlying processes.

Fifthly, considerable effects of global warming on *environmental quality and human living conditions* in general are expected. An increase in global mean temperature might

well lead to a higher frequency of very hot days. Many of us would welcome this sunny prospect but on the other hand, it might worsen water supply conditions in summer, or it might stimulate the spread of tropical diseases like malaria.

#### *1.4 Economic losses due to projected climate change*

This list of physical effects of climate change is not exhaustive but it indicates where the major impacts are to be expected. The next question popping up is of course: what is the economic cost of the adverse effects of future climate change? IPCC TAR tried to estimate the market value of these impacts in monetary terms and concludes cautiously: *“The aggregated market sector effects measured as changes in gross domestic product (GDP), are estimated to be negative for many developing countries for all magnitudes of global mean temperature increase studied (low confidence), and are estimated to be mixed for developed countries up to a few °C warming (low confidence) and negative for warming beyond a few degrees (medium to low confidence).”* IPCC (2001, p. 12)

This conclusion is supported by recent estimates by Tol (2002a,b) who presents an extensive metastudy on economic damage studies and discusses nicely the difficulties involved. Monetary valuation of damages is a highly complex exercise involving many difficult hypotheses (what is the value of a life lost, which discount rate to use, how to aggregate damage over different countries etc.) and is therefore subject to a lot of criticisms. For moderate global warming of about 1 degree Celcius, Tol (2002a) reports *positive* annual benefits of about 2.3% of global GDP when the impacts are simply summed (un-weighted), and of about 0.2% of global GDP using an equity-weighted sum. For stronger warming beyond 1°Celcius, the picture remains mixed but Tol (2001b) concludes: *“In the poorer regions, and in later times, the negative impacts tend to dominate the positive impacts. The former reconfirms that climate change and greenhouse gas abatement policy is essentially a problem of justice.”*

Hence, there is a consensus that the adverse effects of future climate change are likely to affect more strongly poorer individuals in developing countries. As such, the greenhouse problem threatens to deepen even more the gap between the Third World and the industrialised countries. This is a first important conclusion to recall from the scientific analysis of climate change. For the coming century, economic damages from climate change will be distributed very unevenly across countries and therefore, climate change is a concern more of distributional equity than of the mere survival of Planet Earth.

#### *1.5 Strategies to cope with global climate change*

There are basically two strategies to cope with global warming. The first strategy is to adapt to the physical effects, for instance by building higher dikes to protect vulnerable



areas from flooding, developing new, drought resistant varieties of food crops etc. This first strategy is called *adaptation*. The second strategy consists in reducing current GHG emissions to lower the accumulation of atmospheric GHG concentrations with the ultimate aim to stabilize future temperature. This second strategy is called *mitigation*. The IPCC TAR report recognized that a realistic global climate policy will have to use both strategies, mitigation and adaptation, to cope with the projected global change during the next centuries: “*Adaptation is a necessary strategy at all scales to complement climate change mitigation efforts*”.

Before all, one should realise the very important inertia of the global climate system. Figure 3 reveals the extreme time lags involved in the greenhouse problem. Even if CO<sub>2</sub> emissions were to be cut drastically over the next century leading to a stabilization of atmospheric CO<sub>2</sub> concentrations within the next 100 to 300 years, surface air temperature would continue to rise for several centuries longer. Sea level rise would even need several millennia to reach a new equilibrium.

Figure 3: Long term effect of greenhouse effect

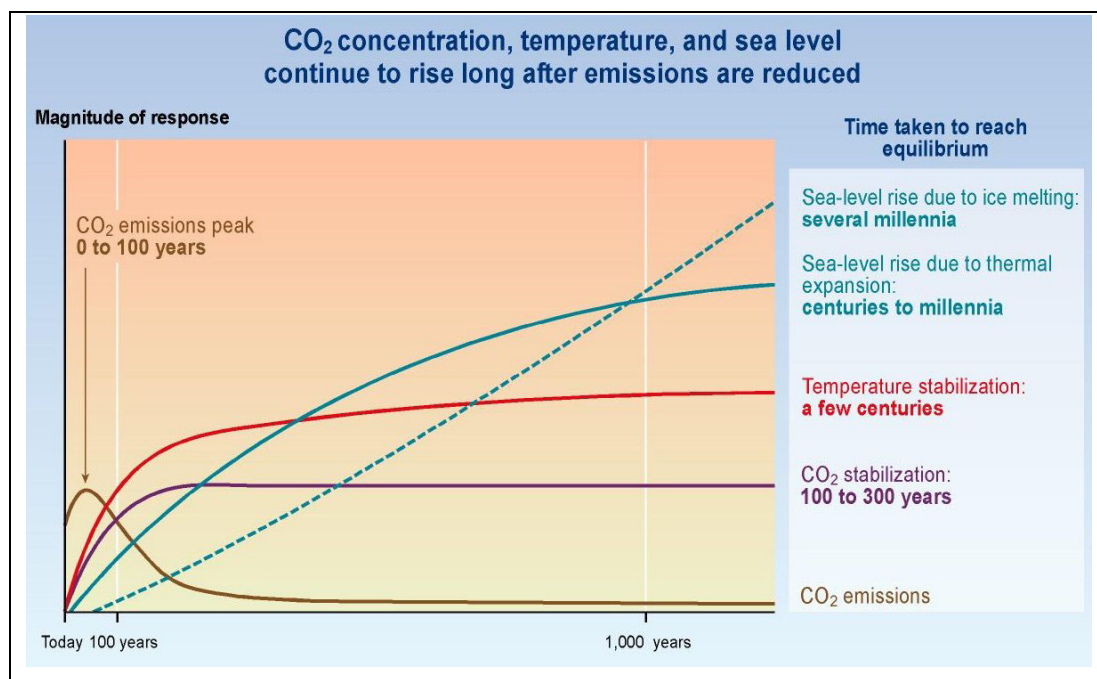


Figure taken from IPCC (2001), Figure SPM-5, p. 17

The fact that it takes several centuries, up to a millennium, before the effect of mitigation measures becomes really tangible, makes it very tempting for current generations to ignore the external effects of their greenhouse gasses emissions. There is little hope that current generations will spontaneously internalise completely the negative externalities of their

current energy consumption patterns<sup>5</sup>. This is a typical conclusion of economic analyses on the intertemporal aspects of climate change mitigation strategies (see, among others, Eyckmans, 2003) and leads us to a second important conclusion. Besides being a problem of *intragenerational* equity (because of the unequal distribution of impacts and damages), global climate change is a prime example of an *intergenerational* equity problem.

Because of the long delays before the effects of mitigation policies appear, the World community will have to incur a great deal of climate change in the coming centuries, regardless of the mitigation strategies that would perhaps be started. Hence, adaptation strategies to soften the effects of projected climate change are indispensable. However, it is widely recognized (see, again the IPCC, 2001, p.227) that “*Those with the least resources have the least capacity to adapt and are the most vulnerable*”. Indeed, recall from the section above that it is expected that the adverse effects of climate change are greatest in developing countries. Therefore, the unequal distribution of resources in the World exacerbates the intragenerational equity problem of global climate change.

#### *1.6 How to share the costs of climate change mitigation efforts?*

Because of the low ability of developing countries to adapt to climate change effects, it has been argued that an international strategy to cope with climate change should also aim at mitigation, hence preventing damages. Up to now, the only realistic mitigation option is to cut emissions of greenhouse gases because there are no end-of-pipe solutions yet. Cutting emissions of greenhouse gases requires to increase the energy efficiency of production, or even to lower production, and as a consequence also consumption levels.

It is well documented in the economics literature that countries differ strongly in the costs at which they can reduce their emissions of greenhouse gases. IPCC TAR gives a comprehensive overview of these studies which we will not reproduce here. The main conclusion from this literature is that in order to achieve a global greenhouse gas emission reduction target at minimal cost, countries with low abatement costs should perform a larger part of the effort than countries with expensive reduction options. So far no problem, but looking at the costs estimates one sees that cheap reduction options are mainly to be found in economies in transition (former Soviet republics, eastern Europe, China) and also in developing countries. The reason is that these economies often use old fashioned, inefficient power plants and production processes. Replacing these by modern, more performing ones is a cheap way of cutting greenhouse gas emissions.

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<sup>5</sup> Nevertheless, international negotiations have resulted in some draft agreements on mitigation strategies, in particular the 1997 Kyoto Protocol. We will come back to these international climate negotiations and agreements later.

The latter observation immediately raises another distributive justice issue. Is it ethically acceptable to require developing countries to perform most of the effort to mitigate global climate change? Developing countries clearly say no to this question. Their position is on the contrary that the developed countries should take the lead and reduce their emissions relatively more. This idea has even been included explicitly into the Principles of the 1992 UN Framework Convention on Climate Change (UNFCCC, see next section for more details on this convention):

*The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.*

UNFCCC (1992), Article 3, Principle 1

By many, this has been seen as an argument to base the reduction of emission reduction efforts on the basis of the relative contribution of countries to historic emissions of greenhouse gases. Figure 4 below shows a world map indicating the share of different countries and regions in cumulative carbon emissions between 1950 and 1999.

Figure 4: Cumulative Carbon Emissions, 1950 - 1999

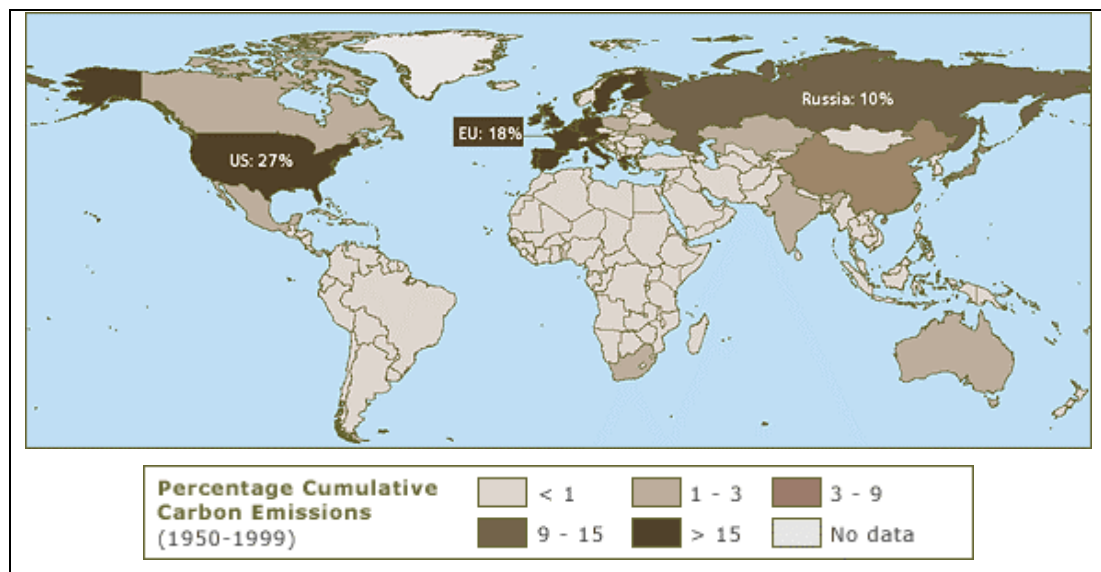


Figure taken from World Resources Institute (2001)

This map illustrates at a country-level historic cumulative carbon emissions (measured as a percentage share of global historic emissions). As indicated on the map, areas with highest cumulative emissions are predominantly found in “northern” richer nations such as the US (at 27%) and the EU (at 18%). Alternatively, lowest carbon emissions are found in economically challenged countries such as those in Africa, South America, and South East

Asia. As a comparison, it is interesting to know that the US stands for approximately 4.08% and the EU for 5.80% of global population<sup>6</sup>.

In part two of this contribution, we will challenge this view and argue that historic responsibility is not a good basis for a just or fair distribution of mitigation and adaptation costs.

### *1.7 International climate negotiations*

The scientific evidence on climate change did not pass by unnoticed by the international political world. This has resulted during the 1992 United Nations Earth Summit in Rio de Janeiro to the adoption of the United Nations Framework Convention on Climate Change, in short the UNFCCC. The aim of this convention is clearly laid down in its second article:

*The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.*

UNFCCC (1992), Article 2

By now (2003), the UN Framework Convention has been ratified by 188 nations worldwide. The Convention establishes the general principles for developing an international climate policy but it does not prescribe policies or quantified emission reduction targets. Instead, it provides for an international negotiation procedure and for legal instruments whose purpose it is to give precise content to the general aims of the Convention.

One of the most powerful legal instruments of the UNFCCC is that of the Protocol (UNFCCC, 1992, Article 17). The 1997 Kyoto Protocol is an example of such a Protocol. It was negotiated and agreed upon during the Third Conference of the Parties (COP3) of the UNFCCC in Kyoto, Japan, in 1997. The Kyoto Protocol requires its signatories (at least a subgroup of them, the so called Annex-B countries) to meet precise greenhouse gas emission targets during the first commitment period extending from 2007 until 2012.

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<sup>6</sup> Figures based on IEA (2001).

Table 1: Emission ceilings agreed in 1997 in Kyoto for some selected Annex-B countries (% reductions compared to 1990 emission levels)

Country	Emission reduction target
USA	-7
Canada	-7
Japan	-6
European Union	-8
Poland	-6
Russian Federation	0
Norway	+1
Iceland	+10
Australia	+8
New Zealand	0

source: Annex B of Kyoto Protocol in UNFCCC (1997)

However, the Kyoto Protocol has still not entered into force. The ratification of the Protocol has been, and continues to be, a very difficult exercise in international diplomacy. First, in 2001 the Bush administration announced that it was not prepared to ratify the Protocol in its current form since it would be harmful for the US economy. The withdrawal of the US makes it very difficult to meet the double ratification requirement of the Protocol:

- (1) at least 55 countries should ratify;
- (2) countries ratifying should represent at least 55% of the total 1990 emissions of all Annex B group taken together.

The first condition was met already a few years ago but the second condition has become problematic given that the US alone stands for more than 34% of 1990 emissions. Only if all other signatories of the Protocol ratify the text, the Kyoto Protocol can enter into force.

Up to now (October 2003), all major players like the EU and Japan have ratified the protocol, except for Russia. Recently however, President Vladimir Putin said that Russia has not yet made a decision on whether to ratify the Kyoto Protocol. Russia needs more time to study the implications of the Kyoto Protocol for the Russian economy and Putin added that the final decision “will take into account the national interests of the Russian Federation”<sup>7</sup>.

Finally, we should stress that even if the Kyoto Protocol were to overcome the ratification hurdles, its environmental effectiveness will be poor. den Elzen and de Moor (2002) write

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<sup>7</sup> PRESIDENT HAS NOT DECIDED ON KYOTO,  
 “President Vladimir Putin said Monday that Russia has not made a decision on whether to ratify the Kyoto Protocol and that the government will not do so until it finishes studying the implications that ratification would have for the country.” THE MOSCOW TIMES, Moscow, Tuesday, September 30, 2003. p. 1.

that the current version of the protocol without the US will bring Annex-B emissions in 2010 to nearly 2% above the 1990-levels whereas the original ambition of the Protocol (including the US) was a reduction by 5%. In terms of global emissions, the effect of the Kyoto Protocol will be hardly noticed. Eyckmans et al (2002) estimate that without Protocol, world carbon emissions would increase by approximately +30% between 1990 and 2010. The current version of the Kyoto Protocol (without the US) would only be capable of limiting this increase to +25%.

## **2. INTERNATIONAL DISTRIBUTIVE JUSTICE: WHAT SHOULD WE AIM FOR?**

There is a large economic literature on how to give a concrete content to the definition of distributive justice and it would not be appropriate to try to formulate a general theory of justice in this short paper (see Schokkaert, 1992, for an overview of the literature). We will instead restrict ourselves to one basic intuition which might be acceptable to many readers and which will prove to be sufficient to structure our analysis of the global climate change problem. We feel that the first and main challenge in our contemporary world is the fact that millions of people do not reach a minimal living standard. In our opinion, the top ethical priority is raising these millions of human beings above this minimum threshold. Our concept of living standard is a very broad one. It is meant to reflect the possibilities of human beings to live a valuable life and therefore refers to both economic and political rights. Of course, there is a huge problem of constructing an index including all these different aspects but for our purposes it is not necessary to be more specific about this formal problem.

This basic idea of concentrating on the poorest people in the world is extremely incomplete as a conception of justice. We will see that it can be rooted in many different ethical systems. The preferential option for the poor also plays an important role in many religious traditions, including the Jewish-Christian and Islamic ones. But, although our starting point is certainly incomplete, it is not vague. In fact, it allows us to get a clearer view on some approaches and arguments that are quite popular in the current discussions on the greenhouse effect. The first is the treatment of “nations” as the most important entities in the ethical debate. The second is the emphasis on cumulative past emissions and historic responsibility. The third is the ecocentric critique on economics. The fourth is the sum-ranking of traditional utilitarianism and the ensuing interpretation of efficiency. Remember that we will sketch an ideal approach and that it will be necessary to use practical approximations for any real-life application. However, it is instructive to have an ideal (although in the present situation not operational) model in mind to avoid taking the pragmatic approximations as a true image of reality.

### *2.1 The ethical status of states: avoiding fantasy*

In the current debate on the greenhouse effect there is a tendency to talk about nations as if they were human beings. One then uses arguments such as: “Bangladesh should be helped because its income per capita is so small”, or: “The United States have a huge responsibility because they are responsible for a large part of the past CO<sub>2</sub>-emissions”. Worse still are references to the “poor South” and the “rich but irresponsible North”. Sen (1981) describes this approach of antropomorphising nations as “fantasy”, “fiction of all nations throbbing as symbolic individuals in existence”.

There are at least two problems with this approach. From an explanatory point of view it reflects an oversimplified vision of the world neglecting the complex interplay of different political and economic forces within each country. This may lead to an excessively optimistic or pessimistic view on the position of individual nations in the international negotiations. Note, e.g., how important a change of the ruling political majority can be in this respect. From a normative point of view (and therefore more important in this context) the practice of “fantasy” leads to a neglect of the interindividual or interregional variation within one country with respect to, e.g., income levels or consequences of global warming. Moreover, it is quite inaccurate to impose on powerless (and possibly also poor) people in the rich countries a part of the responsibility for the misery in other parts of the world.

Our ethical approach proposes to take into account the internal distribution of well-being and power within the different countries. Of course this is an ambitious project and at the present stage we do not dispose of the information (nor do we have sufficient theoretical insights) necessary to make it fully operational. For all practical purposes we will therefore have to fall back on information concerning the various nations to approximate the complexity of the real world. This does not mean that we are playing “fantasy”, if we only remain aware of the fact that this is a short-cut, and that internal differences have to be taken into account in a second step.

### *2.2 Responsibility for past emissions and consequentialism*

Normative economics has been strongly influenced by utilitarianism, which defines social welfare as the simple sum of individual utilities. When using utilitarianism as a starting point for his authoritative writings on economics and ethics, Sen factorizes it into its constituent parts: consequentialism, welfarism and sum-ranking (see, e.g., Sen and Williams, 1982). The following three subsections take up these different aspects.

A special concern for the poor can easily be introduced in consequentialist approaches. In fact, our basic idea can be seen as a weaker version of the Rawlsian difference principle (Rawls, 1971), which has been so influential in contemporary political philosophy. And

our idea of living standard is closely related to Sen's concept of basic capabilities (see, e.g., Sen, 1987) and many recent similar proposals. In these approaches social states are evaluated on the basis of the characteristics of these states and, hence, actions are evaluated on the basis of the consequences of these actions. In the extreme version of consequentialism information about consequences is the only information we need to evaluate actions and other information (on historical background for instance or on the motivation of the action) is irrelevant. In a less extreme interpretation one could say that these other considerations may play a role, but that in any case consequences do matter, i.e. that the ethical evaluation must be consequence-sensitive (to use Sen's terminology).<sup>8</sup> In our context: the extreme poor have the right to be helped, because a social state with many poor is ethically inferior to a social state with only a few poor people. The rich therefore have the ethical duty to help the poor.

It is interesting to confront this position with the actual greenhouse debate, where the position of the Third World Countries has been aptly summarised in the Beijing Ministerial Declaration of Environment and Development (Beijing, June 1991):

*"...the developed countries bear responsibility for the degradation of the global environment. Ever since the Industrial Revolution, the developed countries have over-exploited the world's natural resources through unsustainable patterns of production and consumption, causing damage to the global environment, to the detriment of the developing countries. (...) Responsibility for the emissions of greenhouse gases should be viewed both in historical and cumulative terms, and in terms of current emissions. On the basis of the principle of equity, those developed countries who have contaminated most must contribute more..."*

This argument of the responsibility for the past keeps cropping up in the debate. For instance, during the negotiations of the Kyoto Protocol in 1997, the delegation of Brazil made a proposal for distributing the burden of emission reductions. This so-called *Brazilian Proposal* suggested that reductions towards an overall emission ceiling were to be shared among countries proportional to their relative share of responsibility for climate change. The proposal suggested the use of an agreed simple climate model for estimating the temperature increase resulting from emissions of different countries. The scientific and methodological aspects of the Brazilian proposal were questioned and the Kyoto Protocol was designed without explicit reference to responsibility for past emissions.

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<sup>8</sup> The difference between these options is not so clear if one uses the economic apparatus of "social states". As Dasgupta (1990) writes: "The distinction between acts and consequences in this broader framework (of social states) is formally so tenuous that it is difficult to see how so central a classification as is provided by the labels 'deontological' and 'consequentialist' can be sustained on its basis. If actions matter intrinsically, they can be made part of a description of consequences, and then the distinction collapses".



Yet, in an extreme consequentialist approach the argument is totally irrelevant. The rightness of actions now must be evaluated on the basis of the future consequences of these actions and not on the past. Of course, this does not change the conclusion that the developed countries have to contribute more. Even if the rich countries were not responsible for the bulk of emissions in the past, they still would have a duty to stimulate the development of the poor countries. In a weaker version of consequentialism one could say that past emissions create a specific obligation for the rich countries to compensate the victims of these emissions. But here also the duty for the developed countries to bear the largest burden of emission abatement now is not exclusively dependent on the pattern of past emissions, as long as we judge that the fight against poverty is the main social objective.

Until now we have reasoned within a consequentialist setting. The alternative extreme would be the pure procedural libertarian position that the consequences of actions do not matter for the ethical evaluation of these actions. Within this approach, the action of a person is just if that person had the right to take that action, whatever the consequences. If I own a good, I can do whatever I want with my possession. To us this approach is less attractive, unless one settles in a satisfactory way the problem of the initial allocation of property rights. Moreover, at first sight the libertarian conclusions go strongly against our intuition that the extreme poor have a right to be helped and should not be dependent on the charity of the rich.

However, we should perhaps be careful with the latter conclusion. In fact, even in this libertarian setting one could derive the conclusion that the rich countries have to bear the largest part of the cost of emission abatement. In Kolm (1985)'s theory of the liberal social contract the importance of the poor can follow from the ideas of implicit and fundamental insurance (closely related to consequentialism), or, more important in this context, from the need for compensation for past illegitimacies. With more caveats the compensation argument could also follow from Nozick (1974)'s analysis. A more "leftist-libertarian" position could start from the idea that all human beings have an equal right to nature and that these equal rights have been violated to arrive in the present situation. In all these cases the argument that the richer countries should bear the largest burden follows from past behaviour: their duty is a duty to compensate for the past, because they have used the atmosphere in an illegitimate way. Somewhat paradoxically, the argument from the Beijing-declaration and the Brazilian Proposal, which was largely irrelevant in a consequentialist approach, is the cornerstone to justify the responsibility of the rich countries in this procedural-libertarian framework.

What should we think about this argument? Formulated in a very direct way: do the developed countries have the ethical duty to pay more just because they are rich or

because they have emitted more carbon dioxide in the past? We do not feel that the second answer is the most convincing one. A few decades ago nobody was aware of the negative consequences for the environment of emitting CO<sub>2</sub> and it seems difficult to blame economic agents in the developed countries for the decisions they have taken in this situation of ignorance. To see the point more clearly, consider the following fancy thought experiment. Assume we would discover that a huge global environmental problem (X) is caused by the consumption of a commodity which is heavily concentrated in a poor area of the world, e.g., cassava. At the time of the consumption nobody knew that cassava consumption could be the cause of such problem. Are we going to use the responsibility argument to claim that Africa should bear the burden of the policies aimed at reducing X? Or: would we feel that even if Africa has been (unconsciously) responsible for X, the rich countries should bear the larger burden of the policy? We favour the second answer. But this immediately implies that the burden of the past should also play a minor role in the debate on the ethics of the greenhouse effect. All this also implies that it is difficult to justify our basic intuition in a procedural setting. Of course, this is no problem for us, because we preferred in any case a consequence-sensitive approach to distributive justice.

### *2.3 Living standards and the ecocentric critique*

Although our framework is consequence-sensitive, we are not welfarist. Since we have defined “poverty” in terms of an index of individual (economic and political) rights, we have implicitly taken position against the welfarist position embodied in utilitarianism. Nor did we take the other extreme position of concentrating exclusively on monetary income (another popular approach in economics). In our framework non-income factors are crucial but they are not channelled exclusively via individual utility, whether interpreted as subjective well-being or as the representation of consumer preferences. A full justification for this non-welfarist position is well beyond the scope of our paper. Suffice it to refer to the many contributions by Sen or the more empirically oriented paper by Dasgupta (1990). In this section we only want to suggest how the non-welfarist framework relates to the ecocentric critique on economics.

We have given special attention to the satisfaction of the needs of the poor (although we have interpreted these needs in a broad sense). This makes our framework vulnerable to the ecocentric critique that we treat Nature as an object, about which human beings can decide autonomously. Ecocentrists claim that the emphasis on human needs without due respect for the needs (some would even say: rights) of the natural environment leads to the abuse of Nature. According to them, the only way out of the environmental deterioration is a complete shift in our attitude: we have to realize that Nature has an intrinsic value, independent of its potential for satisfaction of human needs. Man has to be positioned in a wider ecological or cosmic whole, that is valuable in and for itself.

The extreme ecocentric position does not guide us very efficiently in the context of the greenhouse problem. It certainly implies that we use energy in an economical way, but how far do we have to go? Remember that the costs of global warming (and, hence, the benefits of emission abatement) are very uncertain at this moment and to a large extent can be expressed in terms of human suffering and a decrease in agricultural production. The cost of emission abatement can also be expressed in GDP-terms and will probably be very large. An adequate ethical framework must help us in structuring the trade-off between material welfare now and in the future and must also suggest a procedure to weigh the position of different individuals at different welfare levels. The extreme ecocentric position does not help with such careful weighing of costs and benefits of specific actions, where costs and benefits can be expressed largely in terms of human suffering. Rose (1992) and Rose and Stevens (1993) translate ecocentrism in the “general operational rule” that “emissions should be cut back to maximize environmental values” and make this concrete in the context of CO<sub>2</sub>-permits as “limit permits associated with vulnerable ecosystems”. These rules remain extremely vague, too vague in fact to guide us in defining social priorities.

There is a less extreme position, however, which admits that trade-offs have to be made, but emphasizes that the intrinsic value of nature must get an important position in the value system guiding these trade-offs. The basic inspiration of this criticism is extremely valuable and it offers a powerful antidote to the exploitation of nature inspired by crude materialism. Such crude materialism is sometimes reflected in a mere concentration on GDP-growth or a shallow interpretation of utilitarianism. However, the non-welfarist framework offers room to integrate a real concern for Nature even if this would not be reflected in short-sighted individual consumer preferences. Our concept of the living standard is a normative concept and can therefore include an harmonious integration of human beings in nature as one important component. Yet, for reasons explained earlier it can be doubted whether this element will play an important role in the evaluation of policies with respect to global warming.

#### *2.4 Sum-ranking and efficiency*

Utilitarianism takes the simple sum of individual utilities and is therefore, not concerned about the distribution of utilities. In the non-welfarist setting one could choose an analogous procedure and compute the “overall” living standard by summing the different individual living standard indices (assuming for the moment that we can measure these living standards at a level which makes adding meaningful). As with utilitarianism, one could then still argue in favour of income redistribution if the marginal effect of income on the living standard would be decreasing in the income level. Yet, as with utilitarianism,

one would not be interested in the distribution of living standards as such. This is not the approach we defend.

Our basic intuition that the first ethical priority of economic policy must be to raise the poorest people above a minimum threshold implies that they get a larger weight in the calculation of the aggregate than the people with a high living standard. Or, formulated differently: an increase in the living standard of such an individual below the poverty threshold accompanied by an equivalent decrease in the living standard of a person above the threshold will be evaluated as an improvement in the situation according to our ethical system.

This intuition excludes simple sum-ranking but is still compatible with many other approaches. One possible position would be to claim that distribution does no longer matter once all people are lifted above the threshold. Another possibility would be to choose sum-ranking in that situation. Alternatively, one could make the social welfare function a strictly concave and symmetric function of the individual living standards, perhaps with a marginal weight equal to infinity for the individuals below the poverty threshold. The Rawlsian maximin idea would be the extreme case where only the poorest people get a positive weight in the social welfare function, even if everybody is lifted above the threshold (and this is the reason why we claimed earlier that our approach is a weak version of the Rawlsian difference principle). For the present analysis we do not have to choose between these different options but it is obvious that they will lead to sharply opposed policy prescriptions in other concrete settings.

Our framework can be used to evaluate the popular economic approach of maximising overall GNP (or, in the context of global warming, the simple sum of the monetary benefits for all countries). This is sometimes justified as a “value-free” choice for economic efficiency, which makes it possible to avoid value-loaded judgments on distributive justice. This simple justification obviously is not valid. Taking the simple sum of the monetary benefits for all countries implies a specific and in our view ethically extremely unattractive choice of value judgments. It reflects the use of a social welfare function where the concept of living standard is reduced to material income (from marketed sources) and where the income levels of all individuals in all countries are simply added, i.e., where giving one additional unit of income to the richest person in the world gets the same ethical value as giving one additional unit of income to the poorest person.

There exists, however, a more sophisticated economic justification for concentrating on efficiency. If the conditions of the second welfare theorem hold, i.e., if we are in a first-best world with a government disposing of a lump sum-redistributive instrument and using

it to reach an optimal welfare distribution, efficiency and justice considerations can be separated. This argument is sometimes applied to the use of tradable greenhouse gas emission allowances. The initial allocation of the allowances can be used to meet equity objectives. Once this initial allocation has been made, market logic will lead to an allocation of emission reduction costs that is cost efficient, i.e. an allocation of efforts that minimizes overall costs. However, the second welfare theorem does not rescue the one-sided economist studying the greenhouse effect: it is obvious that an international government disposing of lump sum-instruments does not exist. Also in the context of tradable emission allowances there exist natural upper and lower bounds to the initial allocation of permits. For instance, it can hardly be imagined that some countries would be allocated a negative allowance (meaning that they should already pay, even if they would not emit at all) or an allowance exceeding their maximal expected emissions (this is called “hot air” in greenhouse negotiations). Hence, unrestricted lump-sum redistribution is a fiction.

We therefore conclude that the practice of looking for the maximum of world GNP implies an acceptance of unattractive distributional values and should therefore be avoided. The statement that concentrating on efficiency (interpreted in this sense) is value-free is completely mistaken. Note however that all this does not imply that productive efficiency is not a crucial objective in the social calculus of costs and benefits.

## **CONCLUSION**

With this paper we tried to sketch a normative perspective on international greenhouse negotiations. Until now, this perspective has rather been neglected in the economic literature, where more attention has been devoted to the analysis of the process of international negotiations. Both approaches are complementary. The normative analysis should not be naïve and should take into account the economic and political feasibility of its proposals. On the other hand, a consistent ethical framework may help to understand better the actual negotiation process. But the emphasis is different. What we can expect from the negotiations is not necessarily just and therefore the ethical analysis must keep a critical distance. This has been the main focus of this paper.

From an ethical perspective, extreme poverty in large parts of the world remains the main challenge for the economic system. This basic intuition has its roots in many different ethical systems. Nevertheless, we have clearly opted against a narrow utilitarian and a narrow libertarian position and we rejected explicitly that part of the economic tradition concentrating only on economic efficiency.

Our approach is rooted firmly in the Western cultural tradition. This is an important limitation for a treatment of problems of international distributive justice. However, we feel that we cannot do better than to give an explicit exposition of one consistent point of view. Such expositions are a prerequisite for any intercultural debate to get started.

Seen from our broader perspective it is not sensible to isolate the greenhouse problem and look for solutions which would be “partially just”. International distributive justice requires us to go straight to the development problem. Of course, this is not what we can expect as a result from real-world negotiations (and this is where critical distance is absolutely necessary). Real-world negotiations at best focus on the “equitable” distribution of the gains from cooperation. We feel that this is a too narrow focus, because it tends to neglect the grossly unjust starting positions of the different partners in the negotiations. One cannot reasonably speak of a “just” distribution of efforts or gains from greenhouse negotiations if one does not situate these negotiations within the broader context of the unequal international distribution of living standards. An advantage of our consequence-sensitive frame of reference is that it explicitly directs attention to this broader context.

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