



Equity and Sustainable Development in a post-2012 Climate Regime: Interests and Concerns of Developing Countries

October 2006

Authors: Erik Paredis
Gert Goeminne
Frank Maes
Jesse Lambrecht

Promotor: Prof. Dr. Frank Maes

The research project *Equity and Sustainable Development in a post-2012 Regime: Interests and Concerns of Developing Countries* was commissioned by the Flemish Interuniversity Council (VLIR, Vlaamse Interuniversitaire Raad) under its Policy Advisory Research programme (BVO, Beleidsvoorbereidend Onderzoek). This programme is meant to provide scientific support for Belgian federal policy on development cooperation. The project was carried out by a research team consisting of researchers from two departments of Ghent University (Department of Public International Law/Maritime Institute and the Centre for Sustainable Development).

Project coordination and contact:

Erik Paredis

Centre for Sustainable Development – Ghent University

Poel 16

B – 9000 Gent

Belgium

Tel. 0032-9-264.82.08

Fax 0032-9-264.83.90

Erik.Paredis@UGent.be

<http://cdonet.UGent.be>

Contents

Executive summary	6
Samenvatting	16
Introduction	27
Chapter 1. Evolutions in scientific and political debate: slowly taking into account development concerns	30
1.1. The evolving frame of climate science	30
1.2. Political response 1992-2012	34
1.2.1. <i>Equity provisions in the UNFCCC and Kyoto Protocol</i>	35
1.2.2. <i>Political evolution?</i>	40
1.3. The start of the post-2012 debate	41
1.3.1. <i>The Kyoto track</i>	42
1.3.2. <i>The Convention track</i>	45
1.3.3. <i>Avoiding deforestation: The Papua New Guinea proposal</i>	48
1.4. Conclusions	49
Chapter 2. An analysis of developing countries' concerns and interests	52
2.1. Approaches along several lines	52
2.2. Taking the global perspective: concerns and interests of the South	55
2.3. Interests and concerns of regions	57
2.3.1. <i>Africa</i>	57
2.3.2. <i>Asia</i>	63
2.4. Points of view of some major emitters	65
2.4.1. <i>China</i>	66
2.4.2. <i>India</i>	69
2.4.3. <i>Brazil</i>	71
2.4.4. <i>South Africa</i>	74
2.5. The most vulnerable countries: LDCs and SIDS	76
2.6. Conclusions	78
Chapter 3. Making development climate-friendly and more sustainable	79
3.1. The necessity of bringing developing countries on board	79
3.2. The case for integrating development and climate	82
3.2.1. <i>It is already happening in practice</i>	82

3.2.2. <i>The concept of alternative development pathways</i>	84
3.3. Linkages and policy options	87
3.3.1. <i>Linkages between climate and development</i>	88
3.3.2. <i>Policy options</i>	89
3.4. The role of the CDM	93
3.5. Critical reflections: the multiple faces of development	95
3.6. Conclusions	98
Chapter 4. Adapting to unavoidable climate change	100
4.1. Introduction: the contours of adaptation	100
4.2. Adaptation research: an overview of concepts and ideas	102
4.2.1. <i>Vulnerability as a starting point</i>	102
4.2.2. <i>Vulnerability and adaptive capacity across regions</i>	104
4.3. Central issues in the current debate on adaptation	107
4.3.1. <i>Mainstreaming</i>	107
4.3.2. <i>Equity and financing</i>	109
4.3. Conclusions	112
Chapter 5. Developing countries and the architecture of the post 2012 regime	114
5.1. Introduction: post-2012 climate architectures	114
5.2. A three axis analysis framework: environment, economy and development and equity	116
5.3. Seven building blocks for a climate architecture	118
5.3.1. <i>Environmental objective</i>	119
5.3.2. <i>Commitments</i>	123
5.3.3. <i>Differentiation of commitments</i>	133
5.3.4. <i>Market based mechanisms</i>	140
5.3.5. <i>Adaptation policy</i>	145
5.3.6. <i>Technology policy</i>	147
5.3.7. <i>Avoiding deforestation</i>	148
5.4. Conclusion	150
Chapter 6. Belgian federal policy on climate change and developing countries	152
6.1. Current situation	152
6.1.1. <i>Belgian federal climate policy: some institutional aspects</i>	152
6.1.2. <i>Treatment of themes relevant for developing countries</i>	156
6.2. Belgian positions on post-2012	164
6.2.1. <i>Mainstreaming of adaptation in development cooperation</i>	165
6.2.2. <i>Mainstreaming of mitigation</i>	166
6.2.3. <i>Funding</i>	167
6.2.4. <i>CDM</i>	167

<i>6.2.5. Technology transfer</i>	168
<i>6.2.6. Deforestation</i>	168
<i>6.2.7. Capacity building at Belgian level</i>	169
<i>6.2.8. What Belgium (and the EU) should not do</i>	169
Bibliography	171

Executive summary

The problem of climate change is usually interpreted as one of the important global questions of the next decennia. In particular for developing countries a lot is at stake. On the one hand, they are historically least responsible for the problem, but according to all scientific prognoses they will be hardest hit. On the other hand, several growing economies in the South (such as China, India, Brazil) will emit ever more greenhouse gases over the next decennia, which raises the question in how far they can become involved in mitigation of emissions. The specific situation of developing countries is recognised in the Climate Convention (UNFCCC, 1992) and in the Kyoto Protocol (1997). On the level of principles, this is reflected e.g. in the principle of common but differentiated responsibilities and in the right to development. On the level of commitments, it is being recognised in the fact that developing countries currently do not have emission reduction commitments, that arrangements have been made for technology transfer and that they can rely on support for adaptation to the impacts of climate change.

The Kyoto Protocol is only a first modest step in realising the objectives of the UNFCCC. The current commitments under the Kyoto Protocol are not sufficient to prevent dangerous climate change – the ultimate goal of the climate regime, enshrined in art. 2 of the UNFCCC – nor to adapt to unavoidable climate change. Furthermore, since Kyoto most attention has gone to the ratification process of so called Annex I countries. Developing countries have criticised the fact that the long-term objectives of the UNFCCC and the interests of developing countries have faded into the background.

The commitment period of the Kyoto Protocol ends in 2012. The negotiations for a post 2012 climate regime have started during the December 2005 climate conference in Montreal (COP11 and COP/MOP1). A future agreement demands new and additional commitments, inter alia deeper emission cuts in industrialised countries, the broadening of a form of reduction commitments to certain developing countries, and more resources for the South to adapt to climate change. As a consequence, questions of equity in North-South perspective and the linking of the climate regime to (sustainable) development will play an important role in negotiations.

The research project “Equity and Sustainable Development in a post-2012 Regime: Interests and Concerns of Developing Countries” has as objective to further the understanding of what developing countries find important in the climate discussions and why, how this may be translated into a post 2012 architecture, and how Belgian policy and positions may contribute to a future climate regime which takes into account equity considerations and sustainable development. The research project focused on six themes:

- The current state of integration of equity and sustainable development in climate science and politics,*
- A general analysis of developing countries’ concerns and interests along geographical, typological and thematic lines,*
- The problem of making development climate-friendly and more sustainable,*
- The problem of adapting to unavoidable climate change,*

- *How the different building blocks of a post 2012 architecture can take developing countries' interests and concerns into account,*
- *How themes relevant for developing countries are treated in Belgian climate and development policies, and possible positions for post 2012.*

Slow integration of equity and sustainable development in climate science and politics

The first chapter gives a comprehensive overview of some important evolutions in the debate on climate change, equity and sustainable development over the last decade in the fields of science and politics.

The chapter first discusses the scientific debate on climate change and the way the framing of this debate is slowly evolving. In the late 1980s climate change was framed by natural scientists as a problem of long-term disturbance of the global geo-biochemical cycles and the associated effects on global climatic patterns. Climate change was divorced from its social context and normative aspects were largely ignored. Policy options were primarily evaluated in terms of cost-effectiveness. In particular developing country scholars have been making the case for linking climate change to issues of equity and sustainable development. The substantive argument here is the intellectual recognition that sustainable development can be both a framework condition and a motor for the better implementation of climate policy. The institutional argument is the growing awareness that the IPCC has lagged far behind the conditions and principles laid down by the UNFCCC and the importance accorded by the UNFCCC to sustainable development. A full integration of equity and sustainable development in climate change science will demand the involvement of new classes of analysts and new disciplinary perspectives from across inter alia social, legal and organisational sciences. A step in this evolution may be the Fourth Assessment Report of the IPCC, due for 2007, where sustainable development is treated as a cross-cutting issue.

The chapter further analyses the way equity and sustainable development have been integrated in the UNFCCC and the Kyoto Protocol, and presents the last evolution since COP11 and COP/MOP1 in Montreal, November-December 2005. Equity considerations and sustainable development are clearly part of the current regime. They are translated in principles such as the principle of common but differentiated responsibilities, in the differentiation of commitments between Annex I and non-Annex I countries, in articles on financial assistance and technology transfer, and in a certain degree of procedural equity. However, one can hardly claim that these issues have been in the centre of the political debate so far. This is partly because in recent years, a lot of attention and energy went to the ratification process by Annex I countries, which is sometimes interpreted as a marginalization of developing country concerns. Now that the protocol has finally entered into force in February 2005, Southern concerns will have to become more prominent, consistent with the long-term objectives of the UNFCCC.

Furthermore, this renewed attention for developing countries' concerns and interests will be an absolute necessity because it is obvious that current Annex I countries cannot solve the problem of climate change by themselves alone. Some form of participation of (certain) developing countries will be needed in the future. Whether developing countries will be willing to participate in one form or

another in a post-2012 regime, will depend on amongst other things whether the current commitments under the KP will be fulfilled, what the features of the post-2012 regime are and whether these will sufficiently take into account developing countries' concerns and interests.

Since the Montreal climate summit (COP 11 and COP/MOP1), official talks on the future regime are being held along several negotiation tracks. For the moment, there are only two official tracks. The Kyoto track under Article 3.9 KP is meant to discuss new emission reduction commitments for Annex I countries. The Convention track covers a broader perspective in terms of contents (including adaptation, technologies and development goals) and participation (including developing countries and Parties under the UNFCCC which have not yet ratified the Kyoto Protocol). Negotiations under both tracks are currently focused on the organisation of the talks, and on gathering and exchanging information and point of views. A number of additional tracks might emerge in the future based on Article 9 KP (review of the adequacy of the KP) and on two proposals by Papua New Guinea (avoiding deforestation) and by the Russian Federation (voluntary commitments for developing countries).

Analysing developing countries' interests and concerns

Chapter two uses several approaches to describe developing countries' concerns. It is possible to characterise concerns and interests along a geographical line (e.g. North versus South, Asian concerns and priorities, African concerns), to follow a typological line (e.g. major emitters, LDCs), or to follow a thematic approach. The three most important themes which can be identified in the post 2012 literature are: integrating climate change mitigation with (sustainable) development, adaptation to imminent climate change, and the architecture of the climate regime. Chapter 2 gives a broad overview of concerns and interests from these different perspectives.

In general terms it can be said that in most discussions on post 2012 and developing countries, the recurrent underlying theme is similar: how can development goals in the South be reconciled with climate change policies and the international climate regime? Climate change per se is a low national priority issue in most developing countries compared to economic and social development policies such as poverty alleviation, industrialisation, food security, rural development, international trade, energy security etcetera. This strongly suggests that progress in GHG mitigation and adaptation will only occur if pursued from the perspective of development goals rather than for pure environmental/climate concerns. This further implies that developing countries will not be willing to discuss absolute reductions in GHG emissions, but relative decoupling of emissions and economic growth has been explicitly mentioned by different Southern authors and research institutes as a chance for developing country participation in climate mitigation, albeit only on the basis of a clear translation of the principle of common but differentiated responsibilities.

Apart from these concerns related to mitigation, developing countries have over the last years repeatedly stressed that some form of climate change has become unavoidable and that impacts will be felt first and most by the most vulnerable communities and countries, which are also the poorest and least able to adapt to climate change. A lot of countries in the South have fragile ecosystems, while simultaneously large portions of their population and economies are dependent on ecosystems (agriculture, fisheries, forestry...). The fear is that economic development which may be achieved in

the next decades, can be swept away. Major obstacles for formulating and implementing such adaptation measures, include the lack of policy-relevant scientific information at the domestic level and shortage of funding for adaptation at the international level.

A third concern is related to the architecture of the climate regime and in particular to the way it has taken shape in the Kyoto Protocol. A lot of Southern policy-makers and observers feel that previous discussions on the climate regime were conducted in a non-transparent manner and did not adequately consider their interests and needs. A viable post 2012 regime will inter alia be dependent on taking these into account.

The analysis further shows the importance of analysis at the level of individual countries. In order to get a grasp on the complicated problem of climate politics, it is logical that one tries to group countries on the basis of common features (geography, socio-economic characteristics, emission profiles...). This might then lead to a common post 2012 approach for these countries. However, even within these groups, circumstances and characteristics of countries can differ enormously. Hoping that some developing countries will take on forms of non-binding commitments for the post 2012 period, will demand an approach which is flexible enough to fit the circumstances of these countries. As a consequence, it may become even more difficult than in the past for developing countries as a group to defend all these different interests during negotiations. Currently, negotiating positions are determined within the G77 and China group, and defended by the spokes(wo)man of the group (with regularly some dissenting voices). But as the impacts of climate change become more real and the pressure to act as well (in mitigation or adaptation), the diversity and regularly opposing interests in the group will make it more difficult to negotiate equitable deals for all countries. It remains to be seen whether this will be at the cost of countries or country groups with least political power, i.e. groups such as the LDCs and SIDS.

Making development climate friendly and more sustainable

The starting point of chapter three is recent research that teaches that it is necessary for developing countries to start contributing to mitigation of GHG emissions if a rise in global mean temperature of more than 2°C is to be avoided. Evidence shows that over the last decades developing countries have already taken a lot of measures with substantive mitigating effects on their GHG emissions, i.e. their current emissions are far below what business-as-usual projections would have expected. This effect is not caused by explicit climate policies, but is a side-effect of development policies aiming at amongst other things economic growth, energy security and local environmental quality. The question now is whether developing countries will be able to capture the huge potentials for more large-scale emissions mitigation which are still present, and even boost their efforts, in that way contributing to world-wide mitigation efforts. A promising way of doing this seems to be to further integrate climate concerns in non-climate or 'normal' development policies. After all, GHG emissions result from almost every major societal function, in particular those that developing countries find important for their development, such as heating and lighting, transportation, agriculture, industrial activity, etcetera.

Theoretically, this approach is supported by the concept of alternative development pathways. The central argument here is that individual countries and the world as a whole do not follow

predetermined development pathways, but that, depending on policies preferred, different future pathways are possible. These development pathways and the production and consumption patterns associated with them, matter as much for the emissions of greenhouse gases as do climate mitigation policies. Choosing a sustainable development path, where baseline GHG emissions are much lower than in other possible futures, will make it much easier to avoid dangerous climate change.

The IPCC's Third Assessment Report has advanced two broad approaches for intrinsically linking sustainable development and GHG mitigation. A more sustainable development path can be achieved through two categories of interventions: decoupling economic growth from resource flows and decoupling wellbeing from economic output. Climate change mitigation is then one of the co-benefits of these decoupling processes. For developing countries this will be a relative decoupling: GDP grows but resource use and thus environmental pressures grow much slower. For climate change this means that GHG emissions grow at a level clearly under a business-as-usual path. On a more practical level, this implies that priority in development policies should go to amongst other things advanced energy efficient technology, renewable energy technologies, low-emissions vehicles for transport, a better modal split, urban design, biofuel production, sustainable forestry, sustainable agriculture.

It is doubtful whether in its present project form, CDM can contribute to this transition: apart from the fact that a structural reform of developing countries economies cannot be done on a project-by-project base, the CDM is not a sustainable development fund, but a market mechanism. It seeks fast and large returns on investment, with the result that CDM projects are very unevenly distributed geographically, and that the largest projects do not have sustainable development benefits. Even when CDM is reformed to sectoral, programme or policy CDM, it is unlikely that the geographical distribution will change substantially. Besides there are suspicions that unending disputes will surface about the meaning of additionality in turbulently developing economies. This may create an insecure environment for potential investors. Instead of focusing exclusively on CDM, mainstreaming could focus on political and institutional barriers, in that way contributing to the forging of coalitions between mainstream public agencies and private actors. Only these kind of institutions have enough financial and human resources and organisational capacities to support an innovative agenda.

Throughout the whole debate on integrating climate concerns in development policies, enough attention should be paid to discussing the agenda of development, and who are the winners and the losers in this agenda. The development discourse has in the past too often been misused – by national and international actors – for promoting policies which did not contribute to more equitable or sustainable societies. A simple merger of climate and development is an illusion. National and international development shaping trends and circumstances will have to be influenced in such a way that they are favourable to climate-friendly and sustainable development patterns. In the end, this cannot be solely addressed by the UNFCCC, but demands broadening the sustainable development agenda to institutions such as WTO, IMF and World Bank.

Adapting to unavoidable climate change

Adaptation is the topic of chapter four. Regardless of how effectively precautionary measures are taken by the global community to limit anthropogenic greenhouse gas emissions, some degree of

climate change is already unavoidable. Recent research suggests that a rise in global mean temperature of 2°C should possibly be reckoned with, with associated impacts on socioeconomic and biological systems (such as health, agriculture and food security, forests, water resources, coastal areas, habitats and species, physical infrastructure). It has also become common knowledge that the poor are likely to be hit hardest by climate change, and that capacity to respond to climate change is lowest in developing countries and amongst the poorest people in those countries. Adaptation to climate change will thus have to become an important part of international and national climate policy for developing countries.

In the “first generation” of adaptation research, adaptation was seen as the last step in a linear sequence of steps, beginning with the development of emission scenarios, over climate change scenarios, and going on to the determination of physical impacts and identification of adaptation options. In the “second generation” of adaptation research, vulnerability is taken as a starting point. Vulnerability is described as the degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including variability and extremes. Rather than being defined by future climate change scenarios and anticipated adaptations, vulnerability represents a present inability to cope with external pressure or changes, and it is determined by the characteristics of social and ecological systems in a country. Vulnerability assessments can be used to identify the adaptive capacity of a country, which in turn provides insights into the opportunities and constraints to implementing specific adaptation policies. In contrast to the “first generation” adaptation studies the type of policy measures that emerge from a vulnerability approach, are social rather than technical in nature, and include poverty reduction, diversification of livelihoods, protection of common property resources, and strengthening of collective action. Such measures strengthen the ability of individual people and society to respond to stressors and secure livelihoods under present conditions, which should then increase the capacity to adapt to changing conditions in the future. These considerations clearly point to the need for mainstreaming adaptation concerns in development programs and plans, because a lot of the activities that have to be undertaken to reduce vulnerability to the adverse impacts of climate change, particularly in developing countries, are in fact part of what can be considered “normal” (sustainable) development policies.

Mainstreaming refers to incorporating strategies to reduce vulnerability to climate change and variability into existing policies regarding disaster planning, food security, water resource management, health issues, sustainable livelihoods, education etcetera, the primary objective being that adaptation becomes part of programmes that further sustainable development planning. But although the rationale for mainstreaming climate and development is clear, this knowledge has thus far rarely led to the design of policies, programs or projects that bear these findings in mind. Documents that have important impact on development strategies in developing countries, such as national development plans and Poverty Reduction Strategy Papers (PRSP), pay negligible attention to climate change.

Even under the UNFCCC, and although adaptation is referred to in several articles, it was not until the adoption of the Marrakesh Accords in 2007 that adaptation began to be more widely seen as a prominent area for action. Discussions on how adaptation should be incorporated in a post-2012

climate architecture have only just started. Important input may come from the five-year SBSTA programme of work on impacts, vulnerability and adaptation to climate change, agreed upon at COP 11 in Montreal. This programme is intended to assist Parties in addressing methodologies, data and modelling, vulnerability assessments, adaptation planning, measures and actions, and integration into sustainable development. Until now however, work has concentrated on gathering information from relevant sources. The most concrete examples of what adaptation can mean, is currently to be found in the National Adaptation Plans of Action (NAPAs) for Least Developed Countries.

Mainstreaming adaptation and executing specific adaptation plans requires adequate funding. The current climate regime fails to determine how much assistance ought to be made available by developed countries and how they should share the burden of assistance. Currently contributions are entirely voluntary and, as a result, funds for assistance are negligible. Developing countries therefore plea for mandatory contributions based on equity criteria such as responsibility (historical emissions) or capacity (ability to pay) in order to generate firm and regular financial resources at the high levels needed.

Developing countries and the architecture of the post 2012 regime

Over the last years, academic experts, NGO's and governments have been proposing a wide range of alternative options for advancing the international climate change effort beyond 2012. In the fifth chapter, an effort is done to deconstruct the different policy proposals for a future climate architecture in their main constituent elements or "building blocks". Seven building blocks which together establish the basic structure of most proposals for a post 2012 climate regime are identified: the environmental objective of the regime, the kind of commitments the different parties take on, the way these commitments are differentiated, the way market based mechanisms are integrated in the regime, the form and contents of adaptation policy in the regime, the form and contents of technology policy, the way in which avoidance of deforestation is treated. These different building blocks are then analysed on the basis of a three axis framework: environmental effectiveness, economy and development, equity.

The picture that emerges from the analysis is a very complex one: several building blocks have to be addressed, for each building block a multitude of possible approaches are on the table and throughout the whole debate, differing and sometimes competing concerns and interests of many different stakeholders play a role. The analysis with the three axes framework suggests that for developing countries three overarching concerns come to the forefront for the post 2012 regime: 'impacts and vulnerability', 'development needs' and 'historical responsibility for climate change'.

'Impacts and vulnerability' refers to the fact that climate change is a real and present danger for developing countries and to the urgent need for climate policy to obtain a certain degree of awareness of the real and present vulnerabilities of people which will be affected by climate change. How this can be realised remains open but it might be envisaged as a more 'bottom-up' oriented approach focussing on the vulnerability of individuals or groups to both existing climate variability and climatic change. This change in emphasis has also been noticed in the scientific debate concerning adaptation, but the same degree of awareness should be present throughout the whole climate policy

debate and especially on the negotiation level. Besides the building block on adaptation, other building blocks address vulnerability related issues. A more concrete long-term environmental objective could e.g. be seen as an incentive for developed countries to tackle vulnerability and adaptation issues more effectively. Vulnerability concerns are also clearly present in discussions on technology transfer provisions (adaptation technologies) and on commitment types. In the last case, some forms of commitments, such as the SD-PAMs approach, may be more suited for including policies that enhance adaptive capacity.

'Development needs' as a concern mainly stems from the fact that basic development concerns such as economic growth, poverty eradication, human health, etcetera are the first and overriding priorities for developing countries. If climate change policy is to have some appeal to developing countries it will have to succeed in aligning climate and development action. The need to take into account that basic economic and social development are the first priorities of developing country parties has been repeatedly voiced in the climate arena but still needs to be fully implemented. This implies e.g. a need to fully benefit from technological leapfrogging in long-term investments in infrastructure. The recent appeal of the Clean Development Mechanism with developing countries points to their interest in channelling public and private sector investment. Options could be explored to expand and complement the CDM in a way that recognizes the differing national circumstances of developing countries. However, doubts have been expressed whether even a broadening of CDM from project-based to sectoral-based can contribute a lot to a structural transformation of developing countries' economies.

Equity as a developing countries' concern is clearly related to the fact that developing countries bear a very low historical responsibility in climate change. Developing countries have repeatedly voiced this argument to refuse any form of binding commitments. Equity concerns can be related to all building blocks of a future agreement. Indeed, the socio-economic vulnerability of the developing world demands that equity is included within all dimensions of the climate debate if it is to remain relevant to vulnerable groups and the governments of the countries within which they reside.

A climate regime can be regarded as an architecture in which different building blocks have to be included. Where the final architecture of a house should ideally reflect all the concerns and interests of the residents, the ideal climate architecture will have to find a balance between the differing concerns and interests for all nations to 'feel at home'. Therefore, to move forward, it is critical that climate change be approached in its entirety: issues related to adaptation, mitigation, market mechanisms, ... all have to be discussed and it is the way the entire framework, the final architecture, looks like that will decide on the success of future climate policy.

Belgian federal policy on climate change and developing country issues

The political and scientific debate on the post 2012 regime has not yet gained momentum in Belgium. Several initiatives are worth noting, though. Since 2004, the federal Climate Change Section has organised several workshops with stakeholders on national and international policy questions regarding post 2012. At Flemish level, a working group on post 2012 has been set up within the process of the Flemish Climate Conference. Furthermore, the Federal Council for Sustainable

Development (FRDO) has issued three advices on “a strategy to prevent climate changes post 2012.”, in which it states amongst others that Belgium’s policy regarding development cooperation should pay more attention to the theme of climate change, both in actions of capacity building in developing countries and in the elaboration of concrete projects with partner countries. However, in general the concerns and interests of developing countries have hardly been discussed, nor has an analysis been made of where and how Belgium can or should take these into account. The following options could be subject of discussion:

- Mainstreaming of adaptation and mitigation in development cooperation: the Directorate General for Development Cooperation (DGDC) and the Belgian Technical Cooperation (BTC) should start integrating climate change concerns into development cooperation, because until now this has been a non-issue. The Law of 25 May 1999 defines the sectors (basic health care, education, agriculture and food security, basic infrastructure, conflict prevention) and cross-sectoral themes (gender, environment, social economy) on which Belgian development cooperation will be focused. Almost all of these can be affected by climate change. Investments in the different sectors should be made “climate proof”, in the sense that e.g. investments in agricultural systems or in building of infrastructure are done in such a way that they are made resistant to climate change impacts. As is also stated in Belgium’s Federal Plan for Sustainable Development 2004-2008, Belgium should support its partner countries in drawing up national plans which treat climate change as a transversal theme, and Belgium can actively bring up the theme in dialogues on PRSP’s or in multilateral forums of donor countries.
- Funding: DGDC does not contribute to the three climate funds under the UNFCCC and the Kyoto Protocol, but fulfils its commitment of the Bonn Declaration – where Belgium was assumed to provide around US \$ 12 million of the total of US \$ 410 million – through contributions to the GEF. It is remarkable that Belgium negotiated the funds during its presidency of the EU, but does not contribute to them directly. Since after 2012 more funding will be necessary, it may also be necessary to reopen the discussion on this line of policy. Furthermore, the Program Law of 24 December 2002 stipulates that by 2010 Belgium should spend 0,7% of its GDP on ODA, which implies spending almost twice as much on ODA compared to today. Considering the fact that climate is almost absent in current development cooperation, it should be discussed how, apart from mainstreaming, part of this budget can be allocated to the huge needs in adaptation and mitigation in partner countries.
- Clean Development Mechanism: Belgium has received positive comments for its federal CDM tender, because it explicitly tries to incorporate sustainable development criteria in the selection of projects. Also the Flemish tender has tried to incorporate sustainability concerns. Capacity building on the broadened CDM discussion will be necessary, not only to follow the negotiations, but also to prepare possible involvement in these forms of CDM. Since in a lot of developing countries the capacity to develop CDM projects is low, DGDC and BTC could probably play a role in local capacity building, and thus indirectly in building a more sustainable economy. However, CERs from CDM through federal or regional tenders are expected to contribute only 20% to 25% of emission credits needed by Belgium. The rest could be bought through carbon funds, but it is

obvious that a major part of CERs which are expected to come into the market, flow from CDM projects which have no or very limited sustainability benefits. If the Belgian federal level and the regions are serious about contributing to sustainable development, the criteria for purchasing through carbon funds should be made explicit and publicly discussed.

- *Technology transfer: technology transfer is no issue in Belgian policy. Climate change related technology transfer and capacity building is virtually absent in development cooperation; there is no capacity in Belgium itself; there is no consultation on the issue, either within the administration or with stakeholders and the private sector. Moving ahead will mean bringing different administrations, stakeholders and private sector around the table. The National Delcredere Office, the export credit agency, should certainly be involved.*
- *Deforestation: Deforestation is a new theme in the climate negotiations, but it has been an integral part of the sustainable development agenda since the 1990s. It will therefore be necessary to look for synergies between what happens under the UNFCCC and in other forums, such as the activities under the umbrella of the Biodiversity Convention. Keeping in mind the difficult discussions on sustainable forest management over the last 15 years, UNFCCC activities on avoided deforestation might well have to be framed within a broader international policy framework on forests. At Belgian level, it should be studied which activities cause deforestation in the South and how climate policy and other policies can have an impact here.*
- *Capacity building at the Belgian level: It is necessary to strengthen the internal organisation and coordination in order to start the mainstreaming of climate issues in development cooperation, but also in fields such as technology transfer. Better understanding the issues at stake (with policy makers, civil servants and civil society) in order to better formulate policies will also be necessary.*
- *What Belgium and the EU should not do: Negotiators and stakeholders involved in the negotiations have since months been pleading for the creation of “a climate of trust”, in order to be able to build the post 2012 regime. Belgium and several Eu countries are inadequately honouring their commitments in such fields as finance and technology transfer. Further, alarming signals teach that the EU might miss its climate change mitigation target for 2008-2012. Building credibility and a climate of trust for post 2012, and demanding commitments from developing countries, becomes difficult in that way.*

Samenvatting

De klimaatproblematiek wordt algemeen gezien als één van de belangrijke mondiale vraagstukken voor de volgende decennia. Zeker voor ontwikkelingslanden staat er veel op het spel. Enerzijds zijn zij historisch gezien het minst verantwoordelijk voor het probleem, maar zullen ze volgens alle wetenschappelijke prognoses wel de zwaarste gevolgen dragen. Anderzijds zullen vooral een aantal groeiende economieën in het Zuiden (zoals China, India, Brazilië) de volgende decennia zelf steeds meer broeikasgassen uitstoten in hun ontwikkelingsproces, en rijst de vraag in hoeverre zij betrokken moeten worden in de beperking van emissies. In het Klimaatverdrag (UNFCCC, 1992) en het Kyoto Protocol (1997) wordt de specifieke situatie van ontwikkelingslanden erkend. Op het niveau van principes wordt dat bijvoorbeeld gereflecteerd in het principe van de gezamenlijke maar verschillende verantwoordelijkheid en in het recht op ontwikkeling. Op het niveau van verbintenissen wordt het onder andere erkend in het feit dat ontwikkelingslanden momenteel geen emissiereductieverplichtingen hebben, dat er schikkingen voorzien zijn voor technologie-transfer en dat ze moeten kunnen rekenen op hulp bij aanpassing aan de gevolgen van klimaatwijziging.

Het Kyoto Protocol is echter slechts een eerste bescheiden stap om de doelstellingen van het Klimaatverdrag te realiseren. De huidige verbintenissen onder het Kyoto Protocol zijn onvoldoende om gevaarlijke klimaatverandering te voorkomen – nochtans het ultieme doel van het klimaatregime, ingeschreven in Art. 2 van het UNFCCC – of om aanpassing aan de onvermijdbare klimaatverandering mogelijk te maken. Bovendien is sinds Kyoto bijna alle aandacht gegaan naar het ratificatieproces van de zogenaamde Annex I landen. De kritiek van ontwikkelingslanden is dat daarbij zowel de doelstellingen op langere termijn als de belangen van ontwikkelingslanden op de achtergrond geraakt zijn.

De verbintenissen onder het Kyoto Protocol lopen af in 2012. Tijdens de klimaatconferentie in december 2005 in Montreal (COP11 en COP/MOP1) zijn de onderhandelingen over een klimaatregime voor de post-2012 periode gestart. Een toekomstig akkoord zal nieuwe en verdergaande verbintenissen vergen, o.a. verdere emissiereducties in industrielanden, een uitbreiding van een vorm van reductieverbintenissen naar bepaalde ontwikkelingslanden en meer middelen om de gevolgen van klimaatverandering in het Zuiden op te vangen. Daardoor zal in de onderhandelingen een centrale rol weggelegd zijn voor de vraag naar de rechtvaardigheid van een akkoord vanuit Noord-Zuidperspectief en voor de verbinding van het klimaatproces met duurzame ontwikkeling.

Het onderzoek “Rechtvaardigheid en duurzame ontwikkeling in een post-2012 klimaatregime: belangen en bekommernissen van ontwikkelingslanden” heeft als bedoeling beter te begrijpen wat ontwikkelingslanden belangrijk vinden en waarom, hoe dat vertaald kan worden in een post-2012 architectuur, en hoe Belgisch beleid en onderhandelings-posities kunnen bijdragen aan een toekomstig klimaatregime dat rekening houdt met overwegingen van rechtvaardigheid en duurzame ontwikkeling. Het onderzoeksproject heeft zich toegespitst op zes thema's:

- De mate waarin rechtvaardigheid en duurzame ontwikkeling momenteel geïntegreerd zijn in klimaatwetenschap en –beleid,*

- Een algemene geografische, typologische en thematische analyse van de belangen en bekommernissen van ontwikkelingslanden,
- De problematiek van een klimaat-vriendelijke en duurzamere ontwikkeling,
- De problematiek van aanpassing aan onvermijdbare klimaatverandering,
- Hoe de verschillende bouwblokken van een post-2012 architectuur rekening kunnen houden met de belangen en bekommernissen van ontwikkelings-landen,
- Hoe de thema's die relevant zijn voor ontwikkelingslanden benaderd worden in het Belgische klimaat- en ontwikkelingsbeleid, en wat mogelijke posities zijn voor post-2012.

De trage integratie van rechtvaardigheid en duurzame ontwikkeling in klimaatwetenschap en klimaatbeleid

Het eerste hoofdstuk geeft een beknopt overzicht van enkele belangrijke evoluties in wetenschap en politiek in het debat over klimaatverandering, rechtvaardigheid en duurzame ontwikkeling tijdens het laatste decennium.

Het hoofdstuk bespreekt eerst de langzame evolutie in het wetenschappelijk debat over klimaatverandering en de manier waarop dat debat wordt gekaderd. In de late jaren '80 werd klimaatverandering door natuurwetenschappers beschreven als een probleem van lange termijn verstoring van de mondiale bio-chemische cycli en de daarmee verbonden effecten op de mondiale klimaatpatronen. Klimaatverandering werd los gezien van zijn sociale context en normatieve aspecten werden grotendeels genegeerd. Beleidsopties werden in eerste instantie geëvalueerd in termen van kosteneffectiviteit. Het zijn vooral wetenschappers uit ontwikkelingslanden geweest die gepleit hebben voor het leggen van een band tussen klimaatverandering en vragen van rechtvaardigheid en duurzame ontwikkeling. Het inhoudelijke argument daarbij is de intellectuele vaststelling dat duurzame ontwikkeling zowel een randvoorwaarde als een motor kan zijn voor een betere implementatie van klimaatbeleid. Het institutionele argument is het groeiende besef dat het IPCC ver achter gebleven is bij de voorwaarden en principes die vastgelegd zijn door het Klimaatverdrag en bij het belang dat het Klimaatverdrag hecht aan duurzame ontwikkeling. Een volledige integratie van rechtvaardigheid en duurzame ontwikkeling in de klimaatwetenschap zal betrokkenheid vragen van nieuwe analisten en nieuwe disciplinele inzichten uit onder andere de sociale, juridische en beleidswetenschappen. Mogelijk wordt het vierde "Assessment Report" van het IPCC, dat er in 2007 aankomt, een nieuwe stap in die evolutie.

Het hoofdstuk analyseert verder de manier waarop rechtvaardigheid en duurzame ontwikkeling geïntegreerd zijn in het Klimaatverdrag en het Kyoto Protocol, en het bekijkt de laatste evoluties sinds COP 11 en COP/MOP1 in Montreal (november-december 2005). Rechtvaardigheidsoverwegingen en duurzame ontwikkeling zijn duidelijk een onderdeel van het huidige stelsel. Ze zijn onder andere vertaald in het principe van gezamenlijke maar verschillende verantwoordelijkheid, in het onderscheid in verbintenissen tussen Annex I en niet-Annex I landen, in de artikels over financiële ondersteuning en technologieoverdracht, en in een zeker mate van procedurele rechtvaardigheid. Toch kan men moeilijk stellen dat deze thema's tot nu toe in het centrum van het politieke debat stonden. Dat is gedeeltelijk zo omdat in de afgelopen jaren veel aandacht en energie is gestoken in het

ratificatieproces van Annex I landen, wat soms geïnterpreteerd wordt als een marginalisering van de bekommernissen van ontwikkelings-landen. Nu dat het Protocol eindelijk van kracht is, zullen de bekommernissen van het Zuiden meer aandacht moeten krijgen, in lijn met de lange termijn doelstellingen van het Klimaatverdrag.

De hernieuwde aandacht voor de belangen en bekommernissen van ontwikkelingslanden zal trouwens een absolute noodzaak zijn, gezien het feit dat de huidige Annex I landen het probleem van klimaatverandering niet op hun eentje kunnen oplossen. Een bepaalde vorm van participatie van (een aantal) ontwikkelingslanden is in de toekomst noodzakelijk. Of ontwikkelingslanden onder één of andere vorm willen participeren in een post-2012 regime zal onder andere afhangen van de vraag of de huidige verbintenissen onder het Kyoto Protocol gehaald worden, wat de kernmerken zijn van het post-2012 regime en of die voldoende rekening houden met de bekommernissen en belangen van ontwikkelingslanden.

Sinds de klimaatop in Montreal (COP11 en COP/MOP1, november-december 2005) lopen de officiële besprekingen over een toekomstig regime langs verschillende onderhandelingssporen. Momenteel zijn er twee officiële sporen. Het Kyotospoor onder Artikel 3.9 van het Kyoto Protocol heeft als doel om nieuwe emissiereducties te bespreken voor Annex I landen. Het Conventiespoor heeft een breder perspectief op vlak van inhoud (o.a. ook aanpassing, technologie, ontwikkelingsdoelstellingen) en van participatie (ook ontwikkelingslanden en Partijen van het Klimaatverdrag die het Kyoto Protocol nog niet geratificeerd hebben). Op beide sporen spitsen de onderhandelingen zich momenteel toe op de organisatie van de gesprekken, en op verzamelen en uitwisselen van informatie en standpunten. Er zouden in de toekomst nog bijkomende sporen kunnen opkomen, gebaseerd op Artikel 9 van het Kyoto Protocol (beoordeling van de toereikendheid van het Kyoto Protocol) en op twee voorstellen van Papua Nieuw Guinea (voorkomen van ontbossing) en van de Russische Federatie (vrijwillige verbintenissen voor ontwikkelings-landen).

Analyse van de belangen en bekommernissen van ontwikkelingslanden

Hoofdstuk twee gebruikt verschillende benaderingen om de bekommernissen van ontwikkelingslanden te beschrijven. Belangen en bekommernissen kunnen beschreven worden op basis van een geografische indeling (Noord versus Zuid, Aziatische belangen, Afrikaanse...), een typologische indeling (grote uitstoters, minst ontwikkelde landen...) of een thematische indeling. De drie belangrijkste thema's die in de post 2012 literatuur geïdentificeerd kunnen worden, zijn: integratie van bestrijding ('mitigation') van klimaatverandering met (duurzame) ontwikkeling, aanpassing aan onvermijdbare klimaatverandering, en de architectuur van het klimaatregime. Hoofdstuk 2 geeft een breed overzicht van bekommernissen en belangen vanuit die verschillende perspectieven.

In het algemeen kan gesteld worden dat in de meeste besprekingen van "post 2012 en ontwikkelingslanden" één thema altijd terugkeert: hoe kunnen ontwikkelingsdoelstellingen in het Zuiden verzoend worden met klimaatbeleid en het internationale klimaatregime? In vergelijking met sociale en economische beleidsdoelstellingen rond armoedebestrijding, industrialisatie, voedselveiligheid, rurale ontwikkeling, internationale handel, energieveiligheid enzovoort, is klimaatverandering op zich geen nationale prioriteit in de meeste ontwikkelingslanden. Dit geeft aan

dat vooruitgang in de reductie van broeikasgasemissies en in aanpassing aan klimaatverandering hoogstwaarschijnlijk enkel zal gebeuren indien beide benaderd worden vanuit het perspectief van ontwikkelingsdoelen in plaats vanuit louter milieu- of klimaatdoelen. Dit impliceert verder dat ontwikkelingslanden niet bereid zullen zijn om te spreken over absolute reducties in emissies van broeikasgassen. Daar tegenover staat echter dat relatieve ontkoppeling van emissies en economische groei expliciet vermeld wordt door verschillende Zuiderse auteurs en onderzoeksinstituten als een kans voor deelname van ontwikkelingslanden in klimaat'mitigation', zij het dan wel op basis van een duidelijke vertaling van het principe van gemeenschappelijke maar verschillende verantwoordelijkheid.

Naast de bekommernissen die verwant zijn met bestrijding van klimaatverandering (mitigation), hebben ontwikkelingslanden de laatste jaren altijd opnieuw benadrukt dat een zekere mate van klimaatverandering niet meer te vermijden is en dat de gevolgen daarvan eerst en vooral gedragen zullen worden door de meest kwetsbare gemeenschappen en landen, die ook het armst zijn en het minst mogelijkheden hebben om zich aan te passen aan klimaatverandering. Heel wat landen in het Zuiden hebben kwetsbare ecosystemen, terwijl tegelijk een groot deel van hun bevolking en economie afhankelijk is van die ecosystemen (landbouw, visserij, bosbouw...). De vrees bestaat dat de economische ontwikkeling die in de volgende decennia bereikt kan worden, weer weggeveegd wordt. Belangrijke obstakels om aanpassingsmaatregelen te formuleren en te implementeren betreffen onder andere beleidsrelevante wetenschappelijk informatie en financiering voor aanpassing door het internationale niveau.

Een derde bekommernis is de architectuur van het klimaatregime en in het bijzonder de manier waarop die vorm gekregen heeft onder het Kyoto Protocol. Heel wat beleidsmakers en observatoren in het Zuiden vinden dat de voorbije discussies over het klimaatregime niet transparant gevoerd zijn en dat hun belangen en noden niet voldoende opgenomen zijn. De uitvoerbaarheid van een post 2012 regime zal onder andere afhangen van het rekening houden met deze opmerkingen.

Het hoofdstuk toont verder het belang aan van een analyse op het niveau van individuele landen. Om een greep te krijgen op het complexe probleem van klimaatbeleid, is het logisch dat men probeert om landen te groeperen op basis van gemeenschappelijke kenmerken (geografische of socio-economische kenmerken, emissieprofielen...). Dat zou dan kunnen leiden tot een gezamenlijke post-2012 benadering voor die landen. Maar zelfs binnen groepen kunnen omstandigheden en karakteristieken van landen sterk verschillen. Hopen dat bepaalde ontwikkelingslanden vormen van niet-bindende toezeggingen zullen opnemen voor de post-2012 periode, zal een benadering vragen die flexibel genoeg is om te passen in de omstandigheden van deze landen. Het gevolg daarvan is dat het voor de ontwikkelingslanden als groep wel eens moeilijker zou kunnen zijn dan in het verleden om alle verschillende belangen te verdedigen tijdens onderhandelingen. Momenteel worden de onderhandelingsposities bepaald binnen de groep van de G77 en China, en verdedigd door de woordvoerder of –ster van de groep (met regelmatig enkele dissidente stemmen). Maar wanneer de gevolgen van klimaatverandering zichtbaarder worden en de druk om te handelen eveneens (op het vlak van bestrijding of aanpassing), dan zullen de diversiteit en de vaak tegengestelde belangen in de groep het moeilijker maken om voor alle landen een rechtvaardige overeenkomst te onderhandelen.

Het wordt dan afwachten of dit ten koste zal gaan van landen of landengroepen met de minste politieke macht, bijvoorbeeld de LDC-groep of de SIDS-groep.

Ontwikkeling klimaatvriendelijker en duurzamer maken

Het vertrekpunt voor hoofdstuk drie is recent onderzoek dat leert dat, wanneer men een stijging van de gemiddelde temperatuur op aarde met 2°C wil vermijden, het noodzakelijk is dat ontwikkelingslanden beginnen bij te dragen aan de bestrijding van broeikasgasemissies. Er zijn bewijzen dat ontwikkelingslanden gedurende de laatste decennia al heel wat maatregelen hebben genomen die een substantiële bijdrage hebben geleverd aan een daling van hun broeikasgasemissies. Met andere woorden, hun huidige emissies liggen ver beneden de verwachtingen van business-as-usual projecties. Dat effect is niet het gevolg van expliciet klimaatbeleid, maar is een neveneffect van ontwikkelingsbeleid dat gericht is op economische groei, energieveiligheid en lokale milieukwaliteit. Het is nu de vraag of ontwikkelingslanden erin zullen slagen om het enorme potentieel aan grootschalige emissiereducties dat nog altijd aanwezig is verder te benutten en hun inspanningen zelfs nog op te drijven, zodat ze op die manier bijdragen aan wereldwijde reductie-inspanningen. Een verdere integratie van klimaatbekommernissen met niet-klimaat of 'normaal' ontwikkelingsbeleid lijkt een veelbelovende manier om daarvan werk te maken. Bijna elke belangrijke maat-schappelijke functie leidt immers tot de uitstoot van broeikasgassen, zeker functies die ontwikkelingslanden belangrijk vinden, zoals verwarming en verlichting, transport, landbouw, industriële activiteit enzovoorts.

Zo'n benadering wordt op theoretisch vlak ondersteund door het concept van alternatieve ontwikkelingspaden. Het centrale argument daarbij is dat individuele landen en de wereld als geheel geen vooraf vastgelegd ontwikkelingspad volgen, maar dat verschillende toekomstige paden mogelijk zijn, afhankelijk van het beleid dat men voorstaat. Die ontwikkelingspaden en de productie- en consumptiepatronen die ermee samenhangen, zijn even belangrijk voor de uitstoot van broeikasgassen als de invloed van klimaatbeleid. Wordt gekozen voor een duurzaam ontwikkelingspad met baseline emissies die veel lager liggen dan in andere mogelijke toekomst, dan wordt het veel makkelijker om gevaarlijke klimaatverandering te voorkomen.

Het derde Assessment Report van het IPCC heeft twee ruime benaderingen naar voren geschoven om duurzame ontwikkeling en bestrijding van broeikasgasemissies intrinsiek aan elkaar te koppelen. Een duurzamer ontwikkelingspad kan bereikt worden door twee categorieën interventies: het ontkoppelen van economische groei en grondstoffen- en materiaalstromen, en het ontkoppelen van welzijn en economische output. De bestrijding van klimaatverandering is dan één van de nevenvoordelen van deze ontkoppelingprocessen. Voor ontwikkelings-landen zal het gaan om een relatieve ontkoppeling: het BBP groeit maar grondstoffen- en materiaalgebruik en dus milieudruk stijgen veel minder snel. Voor klimaatverandering betekent dit dat de groei in de uitstoot van broeikasgassen duidelijk beneden een business-as-usual pad blijft. Dit impliceert op een praktisch niveau dat in een ontwikkelingsbeleid voorrang moet gaan naar onder andere vooruitstrevende energie-efficiënte technologie, hernieuwbare energietechnologie, voertuigen met lage emissies, een

betere modale split, stedelijk ontwerp, productie van biobrandstoffen, duurzame bosbouw, duurzame landbouw.

Het is twijfelachtig of het Clean Development Mechanism (CDM) in zijn huidige projectvorm veel kan bijdragen aan die transitie. Nog afgezien van het feit dat een structurele hervorming van ontwikkelende economieën niet kan slagen op een project-per-project basis, is het CDM ook geen duurzame ontwikkelingsfonds, maar een marktmechanisme. Het zoekt naar snelle en grote winst op investeringen, met als gevolg dat CDM-projecten geografisch gezien zeer ongelijk verdeeld zijn, en dat de grootste projecten geen duurzaamheidsvoordelen hebben. Zelfs wanneer CDM hervormd wordt naar sectorale, programmatische of beleids-CDM is het onwaarschijnlijk dat de geografische verdeling fundamenteel zal wijzigen. Bovendien wordt vermoed dat er eindeloze meningsverschillen naar boven gaan komen over de betekenis van additionaliteit in turbulent ontwikkelende economieën. Dat kan een onzekere omgeving creëren voor potentiële investeerders. In plaats van uitsluitend op CDM te focussen, zou mainstreaming zich kunnen richten op politieke en institutionele barrières, en op die manier bijdragen aan samenwerking tussen mainstream openbare instanties en private actoren.

Doorheen het debat over de integratie van klimaatbekommernissen in ontwikkelings-beleid, moet er voldoende aandacht gaan naar een discussie over de ontwikkelingsagenda zelf, en wie daarin winnaars en verliezers zijn. In het verleden is het discours over ontwikkeling te vaak misbruikt – door nationale of internationale actoren – om beleid te verdedigen dat geen bijdrage had aan rechtvaardigere of duurzamere maatschappijen. Een eenvoudige versmelting van klimaat en ontwikkeling is een illusie. De trends en omstandigheden die nationaal en internationaal vorm geven aan ontwikkeling moeten op zo'n manier beïnvloed worden dat ze gunstig zijn voor klimaatvriendelijkere en duurzamere ontwikkeling. In laatste instantie kan dat niet enkel binnen het Klimaatverdrag aangepakt worden, maar vereist dat een uitbreiding van de duurzame ontwikkelings-agenda naar instellingen zoals de Wereldhandelsorganisatie, het IMF en de Wereldbank.

Aanpassen aan onvermijdbare klimaatverandering

Het onderwerp van hoofdstuk vier is aanpassing. Een zekere mate van klimaatverandering is al onvermijdbaar, onafgezien van hoe effectief de wereldgemeenschap maatregelen neemt om de uitstoot van broeikasgassen te beperken. Recent onderzoek suggereert dat er mogelijk rekening gehouden moet worden met een stijging van de temperatuur op aarde met gemiddeld 2°C, en dus met de gevolgen daarvan op socio-economische en biologische systemen (zoals gezondheid, landbouw en voedselveiligheid, bossen, watervoorraden, kustzones, habitats en soorten, fysische infrastructuur). Het is algemeen geweten dat de armsten waarschijnlijk het hardst getroffen zullen worden en dat de capaciteit om op klimaatverandering in te spelen het kleinst is in ontwikkelingslanden en bij de arme bevolking in die landen. Aanpassing aan klimaat-verandering zal zo een belangrijk onderdeel moeten worden van internationaal en nationaal klimaatbeleid voor ontwikkelingslanden.

In het “eerste generatie” adaptatie-onderzoek werd aanpassing gezien als de laatste stap in een lineair proces dat begint met de ontwikkeling van emissiescenario's, dan overgaat in klimaatscenario's en tenslotte in de vaststelling van fysische impacts en de identificatie van aanpassingsopties. In het “tweede generatie” adaptatieonderzoek wordt kwetsbaarheid als vertrekpunt genomen. Kwetsbaarheid

wordt daarbij omschreven als de mate waarin een systeem gevoelig is voor of niet bekwaam is om de negatieve effecten van klimaatverandering op te vangen (daarin inbegrepen variabiliteit en extremen). In plaats van dat kwetsbaarheid bepaald zou worden door toekomstige klimaatscenario's en verwachte aanpassingen, verwijst kwetsbaarheid dus naar het huidige onvermogen om om te gaan met externe druk en veranderingen, en wordt het bepaald door de kenmerken van de sociale en ecologische systemen van een land. Beoordelingen van kwetsbaarheid kunnen gebruikt worden om de capaciteit tot aanpassing van een land te bepalen. Dat zorgt op zijn beurt weer voor inzicht in de kansen en beperkingen voor de implementatie van specifiek aanpassings-beleid. Een verschil met de "eerste generatie" aanpassingsstudies is dat het soort beleidsmaatregelen dat voortvloeit uit een kwetsbaarheidsbenadering eerder sociaal dan technisch van opzet is. Het betreft onder andere maatregelen ter bestrijding van armoede, diversificatie in levensonderhoud, bescherming van gemeenschappelijke eigendom van hulpbronnen, en versterking van collectieve actie. Zulke maatregelen versterken het vermogen van individuele mensen en van een maatschappij als geheel om in de huidige omstandigheden te reageren op drukfactoren en om hun levensonderhoud veilig te stellen. Dat zou vervolgens ook moeten leiden tot een versterking van de capaciteit om zich in de toekomst aan te passen aan veranderende omstandigheden. Dit soort overwegingen wijst duidelijk op de nood aan mainstreaming van aanpassing in ontwikkelingsprogramma's en -plannen. Want veel activiteiten die opgezet moeten worden om de kwetsbaarheid voor negatieve klimaatimpact te verminderen, zeker in ontwikkelingslanden, zijn in feite een deel van wat als "normaal" (duurzaam) ontwikkelingsbeleid omschreven kan worden.

Mainstreaming verwijst naar de integratie van strategieën, gericht op beperking van kwetsbaarheid voor klimaatverandering en -variabiliteit, in bestaand beleid rond rampenplanning, voedselveiligheid, beheer van watervoorraden, gezondheid, duurzaam levensonderhoud, onderwijs enzovoort. Het doel is dat aanpassing een normaal onderdeel wordt van programma's om duurzame ontwikkeling te bevorderen. Maar hoewel de basis voor mainstreaming van klimaat in ontwikkeling duidelijk is, heeft die kennis er tot nu toe zelden toe geleid dat ze in rekening wordt gebracht bij het ontwerpen van beleid, programma's of projecten. Documenten met grote invloed op ontwikkelingsstrategieën van ontwikkelingslanden, zoals nationale ontwikkelingsplannen of Poverty Reduction Strategy Papers (PRSP) hebben nauwelijks aandacht voor klimaatverandering.

Hoewel er in het UNFCCC in verschillende artikels verwezen wordt naar aanpassing, is het pas sinds de aanvaarding van de Marrakesh Akkoorden in 2001 dat men aanpassing als een belangrijk actieterrein is beginnen zien. De discussie over hoe aanpassing ingevoegd moet worden in een post 2012 klimaatarchitectuur is nog maar net begonnen. Belangrijke input daarvoor kan komen van het 5-jarige werkprogramma onder de SBSTA dat op COP 11 in Montreal overeengekomen werd, en dat handelt over impacts, kwetsbaarheid en aanpassing aan klimaatverandering. Het werkprogramma heeft de bedoeling om Partijen te helpen in het omgaan met methodologieën, data en modellering, met beoordelingen van kwetsbaarheid, met aanpassingsplanning, -maatregelen en -acties, en met integratie in duurzaam ontwikkelingsbeleid. Tot nu toe heeft het werk zich vooral toegespitst op informatieverzameling uit relevante bronnen. De beste voorbeelden van wat aanpassing kan

betekenen zijn momenteel te vinden in de National Adaptation Plans of Action (NAPAs) van de minst ontwikkelde landen.

Aanpassing mainstreamen en specifieke aanpassingsplannen uitvoeren, veronderstelt voldoende financiering. Het huidige klimaatregime slaagt er niet in om te bepalen hoeveel ondersteuning vrij gemaakt zou moeten worden door ontwikkelde landen en hoe zij de last voor ondersteuning zouden kunnen verdelen. Momenteel zijn de bijdragen volledig vrijwillig, met als gevolg dat de beschikbare fondsen verwaarloosbaar zijn. Daarom pleiten ontwikkelingslanden voor verplichte bijdragen die gebaseerd worden op rechtvaardigheidscriteria zoals verantwoordelijkheid (historische emissies) of capaciteit (om te betalen), in de hoop op die manier verzekerd te zijn van vaste en regelmatige financiële middelen op het hoge niveau dat nodig is.

Ontwikkelingslanden en de architectuur van het post 2012 regime

Academicici, NGO's en regeringen hebben in de loop van de laatste jaren heel wat verschillende voorstellen gedaan om de internationale inspanningen rond klimaatverandering na 2012 vooruit te helpen. In het vijfde hoofdstuk wordt een inspanning gedaan om de verschillende voorstellen voor een toekomstig klimaatregime te ontrafelen in hun verschillende samenstellende delen of "bouwblokken". Er worden zeven bouwblokken geïdentificeerd die tezamen de basisstructuur vormen van het merendeel van de voorstellen voor een post-2012 regime: het milieudoel van het regime, het soort verbintenissen dat de verschillende partijen opnemen, de manier waarop die verbintenissen gedifferentieerd worden, de manier waarop marktmechanismen geïntegreerd worden in het regime, de vorm en inhoud van het technologiebeleid, de manier waarop vermijden van ontbossing benaderd wordt. Die verschillende bouwblokken worden dan geanalyseerd op basis van een kader met drie assen: milieueffectiviteit, economie en ontwikkeling, rechtvaardigheid.

Het beeld dat uit de analyse naar boven komt, is erg complex: verschillende bouwblokken moeten aangepakt worden, voor elk bouwblok ligt er een veelheid aan mogelijk benaderingen op tafel en doorheen het hele debat spelen uiteenlopende en soms tegengestelde bekommernissen en belangen een rol. De analyse op basis van het assenkader suggereert dat er voor ontwikkelingslanden drie overkoepelende bekommernissen naar voren komen voor een post-2012 regime: 'impacts en kwetsbaarheid', 'ontwikkelingsnoden' en 'historische verantwoordelijkheid voor klimaatverandering'.

Met 'impacts en kwetsbaarheid' wordt verwezen naar het feit dat klimaatverandering een reëel en actueel gevaar is voor ontwikkelingslanden en dat er dringend nood is aan een zekere mate van bewustzijn in het klimaatbeleid van de echte kwetsbaarheid van mensen. Hoe dat gerealiseerd moet worden, ligt open maar men zou het zich kunnen voorstellen als een benadering die zich meer vanuit een 'bottom-up' aanpak richt op de sociale kwetsbaarheid van individuen of groepen voor klimaatverandering en bestaande klimaatvariabiliteit. Deze verandering van klemtoon werd ook waargenomen in het wetenschappelijk debat over aanpassing, maar dezelfde mate van bewustzijn zou aanwezig moeten zijn in het hele klimaatdebat, en zeker op onderhandelingsniveau. Naast het bouwblok over aanpassing, komen aan kwetsbaarheid verbonden thema's terug onder andere bouwblokken. Een scherper geformuleerde langetermijn-milieudoelstelling zou bijvoorbeeld gezien kunnen worden als een stimulans voor ontwikkelde landen om kwetsbaarheid en aanpassingsthema's

effectiever aan te pakken. Bekommernissen rond kwetsbaarheid zijn ook duidelijk aanwezig in de discussies over de voorzieningen voor technologieoverdracht (aanpassingstechnologieën) en over soorten verbintenissen. In dat laatste geval kunnen sommige vormen van verbintenissen, bijvoorbeeld de SD-PAMs benadering, geschikter zijn om beleid te bevatten dat gericht is op verhogen van de aanpassingscapaciteit, dan andere benaderingen.

De bekommernis 'ontwikkelingsbehoeften' komt vooral voort uit het feit dat elementaire ontwikkelingsbekommernissen zoals economische groei, armoedebestrijding, menselijke gezondheid enzovoort de eerste en belangrijkste prioriteiten zijn voor veel ontwikkelingslanden. Als klimaatbeleid enige aantrekkingskracht wil hebben voor ontwikkelingslanden, dan moet het erin slagen klimaat- en ontwikkelingsacties met elkaar te verbinden. Dat er nood is om economische en sociale ontwikkeling te zien als de eerste prioriteiten van ontwikkelingslanden is al vaak verwoord in de klimaatarena, maar het moet nog altijd geïmplementeerd worden. Het impliceert bijvoorbeeld dat ontwikkelingslanden ten volle gebruik moeten kunnen maken van de voordelen van technologische 'leapfrogging' in langetermijn investeringen in infrastructuur. De recente aantrekkingskracht van het Clean Development Mechanism bij ontwikkelingslanden wijst op hun interesse om investeringen in de publieke en private sector te kanaliseren. Er kunnen opties onderzocht worden om CDM uit te breiden en aan te vullen op zo'n manier dat de verschillende nationale omstandigheden van ontwikkelingslanden in rekening gebracht worden. Er zijn echter ook twijfels geformuleerd of zelfs een uitbreiding van project-CDM naar sector-CDM veel kan bijdragen aan een structurele omschakeling van ontwikkelingseconomieën.

Dat rechtvaardigheid een bekommernis is van ontwikkelingslanden is duidelijk verbonden met het feit dat ontwikkelingslanden een zeer beperkte historische verantwoordelijkheid hebben voor klimaatverandering. Dat argument is ook herhaaldelijk gebruikt door ontwikkelingslanden om elke vorm van bindende verplichtingen te weigeren. Rechtvaardigheidsbekommernissen kunnen gelieerd worden aan elk bouwblok van een toekomstig akkoord. De socio-economische kwetsbaarheid van ontwikkelingslanden vraagt ook dat rechtvaardigheid opgenomen is in elke dimensie van het klimaatdebat, indien dat debat relevant wil blijven voor kwetsbare groepen en de regeringen van de landen waar die groepen zich bevinden.

Een klimaatregime kan bekeken worden als een bouwwerk dat verschillende bouwblokken moet bevatten. In het ideale geval weerspiegelt de architectuur van een huis de bekommernissen en interesses van zijn bewoners. Zo zal de ideale architectuur van een klimaatregime ook een evenwicht moeten vinden tussen de uiteenlopende bekommernissen en belangen van alle landen voordat ze zich er in thuis zullen voelen. Om vooruitgang te boeken is het cruciaal dat klimaatverandering benaderd vanuit zijn totaliteit: onderwerpen verwant aan aanpassing, bestrijding (mitigation), marktmechanismen enzovoort moeten alle bediscussieerd worden. Hoe het volledige kader, de finale architectuur, er uitziet zal bepalend zijn voor het succes van het klimaatbeleid in de toekomst.

Belgisch federaal beleid rond klimaatverandering en thema's van ontwikkelingslanden

Het politieke en wetenschappelijke debat over het post-2012 regime scheert nog geen hoge toppen in België, maar verschillende initiatieven zijn toch de moeite waard. Sinds 2004 organiseert de federale

Klimaatcel workshops rond post 2012 met betrokkenen in nationale en internationale beleidskwesties. Op Vlaams niveau is er in het kader van de Vlaamse Klimaatconferentie een werkgroep post-2012 opgezet. De Federale Raad voor Duurzame Ontwikkeling (FRDO) heeft drie adviezen uitgebracht over “een strategie om klimaatverandering te voorkomen post 2012”. Daarin wordt onder andere gesteld dat de Belgische ontwikkelingssamenwerking meer aandacht zou moeten besteden aan het thema klimaatverandering, zowel op vlak van capaciteitsopbouw in ontwikkelingslanden als in de uitwerking van concrete projecten in partnerlanden. Maar in het algemeen worden de belangen en bekommernissen van ontwikkelingslanden nauwelijks besproken en bestaat er geen analyse van waar en hoe België die beter in rekening zou kunnen brengen. De volgende opties zouden onderwerp van discussie zouden zijn:

- *Mainstreaming van ‘adaptation’ en ‘mitigation’ in ontwikkelingssamenwerking: Het Directoraat-Generaal Ontwikkelings-Samenwerking (DGOS) en de Belgische Technische Coöperatie (BTC) zouden werk moeten maken van de integratie van bekommernissen van klimaatverandering in ontwikkelingssamenwerking, want tot nu toe is dat geen thema. De Wet van 25 Mei 1999 definieert de sectoren (basis-gezondheidszorg, onderwijs, landbouw en voedselveiligheid, basisinfrastructuur, con-flictpreventie) en cross-sectorale thema’s (gender, milieu, sociale economie) waarop de Belgische ontwikkelingssamenwerking zich zal toespitsen. Bijna al die zaken kunnen door klimaatverandering aangetast worden. Investerings in de verschillende sectoren zouden “klimaatbestendig” moeten worden, in de zin dat bijvoorbeeld investeringen in landbouwsystemen of in infrastructuur op zo’n manier gebeuren dat ze weerstand kunnen bieden aan de impacts van klimaatverandering. Zoals gesteld wordt in het Belgische Federale Plan voor Duurzame Ontwikkeling 2004-2008 zou België zijn partnerlanden moeten steunen in de opmaak van nationale plannen die klimaatverandering benaderen als transversaal thema. België kan dit thema ook op de agenda zetten in dialogen over PRSP’s of in multilaterale fora van donorlanden.*
- *Financiering: DGOS draagt niet bij aan de drie klimaatfondsen onder het UNFCCC en het Kyoto Protocol, maar België vervult zijn plichten onder de Bonn Verklaring – volgens dewelke België ongeveer 12 miljoen US \$ zou moeten bijdragen op een totaal van 410 miljoen US \$ - via bijdragen aan de General Environmental Facility (GEF). Het is opmerkelijk dat België de fondsen mee onderhandeld heeft tijdens zijn voorzitterschap van de EU, maar dat het er niet direct aan bijdraagt. Omdat er na 2012 zeker meer financiering nodig zal zijn, is het aangewezen om de discussie over die beleidslijn terug te openen. Bovendien stelt de Programmawet van 24 december 2002 dat België tegen 2010 0,7% van zijn BBP aan ontwikkelingshulp moet besteden. Dat betekent dat twee keer meer hulp moet worden gegeven als vandaag. Aangezien klimaat bijna afwezig is in de huidige ontwikkelings-samenwerking, zou besproken moeten worden hoe, behalve via mainstreaming, een gedeelte van dit budget toegewezen kan worden aan de hoge noden in ‘adaptation’ en ‘mitigation’ in partnerlanden.*
- *Clean Development Mechanism: België heeft positieve commentaren gekregen op zijn federale CDM tender, omdat die expliciet probeert om duurzame ontwikkelingscriteria op te nemen in de selectie van projecten. Capaciteitsopbouw rond een verruimde CDM zal noodzakelijk zijn, niet alleen om onderhandelingen op te volgen, maar ook als voorbereiding op mogelijk betrokkenheid*

in die vormen van CDM. Omdat in heel wat ontwikkelingslanden de capaciteit om CDM-projecten te ontwikkelen beperkt is, zouden DGOS en BTC mogelijk een rol kunnen spelen in lokale capaciteits-opbouw, en op die manier indirect bijdragen aan een duurzamere economie. Langs de andere kant wordt verwacht dat de emissiekredieten uit CDM (CERs) van de federale en regionale tenders slechts 20% tot 25% zullen bijdragen aan de emissiekredieten die België nodig heeft. De rest zou aangekocht kunnen worden via koolstoffondsen, maar het is duidelijk dat een belangrijk deel van de CERs die men op de markt verwacht, voortvloeien uit projecten die geen of slechts heel beperkt duurzaamheidsvoordelen bieden. Als het Belgische federale niveau en de regio's het ernstig menen met hun bijdrage aan duurzame ontwikkeling, dan zouden de criteria voor aankoop via koolstoffondsen geëxpliciteerd moeten worden en openlijk besproken.

- *Technologietransfer: Technologietransfer is geen thema in Belgisch beleid. Technologietransfer en capaciteitsopbouw in het kader van klimaatverandering is geen thema in ontwikkelings-samenwerking; er is geen capaciteit in België zelf; er is geen overleg over het thema, niet binnen de administratie en niet met stakeholders en de private sector. Om vooruitgang te boeken zullen verschillende administraties, stakeholders en de private sector rond tafel gebracht moeten worden. Ook de nationale Delcrederedienst, de nationale exportkredietverzekeraar, zou hier zeker bij betrokken moeten worden.*
- *Ontbossing: Ontbossing is een nieuw thema in de klimaatonderhandelingen, maar het is een integraal deel van de duurzame ontwikkelingsagenda sinds de jaren negentig. Het zal daarom noodzakelijk zijn om te kijken naar synergieën tussen wat binnen het UNFCCC gebeurt en in andere fora, zoals de activiteiten onder het Bio-diversiteitsverdrag. Met de moeilijke discussies van de afgelopen 15 jaar in het achterhoofd over duurzaam bosbeheer, zou het noodzakelijk kunnen zijn om de UNFCCC activiteiten rond vermindering van ontbossing te kaderen in een breder international kader rond bossen. Op Belgisch niveau zou bestudeerd moeten worden welke activiteiten ontbossing in het Zuiden veroorzaken en hoe klimaat- en ander beleid hierop impact kan hebben.*
- *Capaciteitsopbouw op het Belgische niveau: Het is noodzakelijk de interne organisatie en coördinatie te versterken om met de mainstreaming van klimaatthema's van start te gaan in ontwikkelings-samenwerking en in technologietransfer. Beter beleidsformulering voor post 2012 vergt ook verder inzicht verwerven in wat er allemaal op het spel staat (bij beleidsmakers, administratie, civiele maatschappij).*
- *Wat België (en de EU) beter niet zou doen: Onderhandelaars en andere betrokkenen in de onderhandelingen pleiten al maandenlang voor werken aan een "klimaat van vertrouwen" om te kunnen beginnen bouwen aan het post 2012 regime. Momenteel komen België en vele EU landen onvoldoende tegemoet aan hun verbintenissen op terreinen als financiering en technologietransfer. Er zijn ook onrustwekkende signalen over het al dan niet halen van de uitstoot-reductieverplichtingen voor 2008-2012 in de EU. Geloofwaardigheid en een klimaat van vertrouwen opbouwen voor post 2012, en van ontwikkelingslanden verbintenissen vragen, wordt moeilijk op die manier.*

Introduction

A few years ago, Priyarshi Shukla¹ has remarked somewhat ironically that the timing of the climate change issue is inconvenient and inopportune for developing countries. Inconvenient since it coincides with a moment when developing countries are set for rapid economic growth; inopportune since their low stature in global power relations makes it difficult to negotiate agreements in their favour (Shukla 2002). The reality of climate change, however, does not care about the adequacy of timing. While the evidence is mounting that climate change may be upon us earlier than expected, developed and developing countries alike have to prepare for the next round of negotiations in the climate arena, the so called post 2012 negotiations.

The period during which the data for this research project were gathered (July 2005 – September 2006) coincided more or less with the start of that political debate on post 2012. In the 2 to 3 years preceding this period, the debate in the scientific literature, in the community of ngo's, business and research organisations, had already started and produced several proposals for a post 2012 regime. But the developments in the political world have been slower – partly due to the fact that the operationalisation of the Kyoto Protocol demanded a lot of energy – and more cautious. Consequently, the different countries and country groups are still in the first stages of exploring each other's positions and formulating one's own. In particular, statements on what the architecture of the post 2012 regime should look like, should be considered preliminary, since during the negotiations positions may and will probably change. The first explicit positions were taken during the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG, 17-25 May 2006, Bonn) and the Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention (15-16 May 2006, Bonn).

This research project *Equity and Sustainable Development in a post-2012 Regime: Interests and Concerns of Developing Countries* was commissioned by the Flemish Interuniversity Council (VLIR, Vlaamse Interuniversitaire Raad) under its Policy Advisory Research programme (BVO, Beleidsvoorbereidend Onderzoek), which is meant to provide scientific support for Belgian federal policy on development cooperation. The project was carried out by a research team consisting of researchers from two departments of Ghent University (Department of Public International Law/Maritime Institute and the Centre for Sustainable Development). One of the main objectives of the project is to better understand developing countries' positions in the post 2012 climate debate. While on the one hand industrialised countries must continue taking the lead in combating dangerous climate change, developing countries will undoubtedly be called upon to participate under one form or another in the post 2012 climate regime. This demands of course understanding what developing countries find important and why, how this may be translated into a post 2012 architecture, and how Belgian policy and positions may contribute to a future climate regime which takes into account equity considerations and sustainable development.

¹ Shukla is currently coordinating lead author in the Working Group III writing team for the IPCC Fourth Assessment Report.

From the materials which have been produced during the last years, a picture is emerging of what developing countries' concerns and interests are in the post 2012 discussion. It is to be noted though that research, positions, statements from developing countries' scientists, ngo's or political think tanks are markedly fewer than those from industrialised countries. Research from Kameyama (2004) showed that at that moment 79% of post 2012 proposals in English scientific literature were from EU and US researchers, while only 15% originated in non-Annex-I countries, in particular Brazil, Argentina, India, China and South-Africa. In the last 2 to 3 years several initiatives have been set up to highlight concerns and proposals from a developing country perspective; in other exercises, research teams and/or actors from civil society in North and South have tried to reach a common understanding about post 2012.

While in surrounding European countries and in an international context, research on these kind of topics has taken off over the last years, there is remarkably few research on them in Belgium. In close consultation with the advisory committee of the project, it was decided to take a broad approach to the topic, looking into questions of mitigation, adaptation as well as regime architecture, and current and possible future Belgian positions on these issues. This may be at the cost of depth in different chapters, but the research team hopes that groundwork has been laid on which future research in Belgium on climate change, equity, sustainable development and developing country concerns can build.

The report consists of six chapters. Chapter one discusses some important evolutions in the scientific debate on climate change, where equity and sustainable development are slowly entering the research frame, and analyses the current state of the political debate in terms of equity and sustainable development. Chapter two presents a general overview of concerns and interests of developing countries for the post 2012 period, following an analysis along geographical and typological lines. Chapter three and four go into some more detail on two of the central themes in the climate debate: mitigation and adaptation, specifically for developing countries. Chapter five analyses the several building blocks which most proposals for post 2012 architectures consist of, and discusses them along a three axis framework (environment, economy and development, equity). It also contains a discussion of obstacles and possibilities for a legal translation of developing countries' concerns in a post 2012 climate regime. Finally, chapter six takes a look at the current treatment of themes relevant for developing countries in Belgian policy, and proposes some options for post 2012 positions.

The research benefited immensely from the discussions with and cooperation of a lot of individuals and organisations. The chance for researchers to participate as observer in the Belgian delegation to COP 11 and COP/MOP1 in Montreal, opened up the possibility to closely follow political negotiations and have intensive contacts with negotiators, other researchers and civil society actors from South and North. Additional funding from VLIR and support from the Department of Research Affairs of Ghent University made it possible to invite two researchers from the South (Preety Bandari, The Energy and Resources Institute, India; Joshua Wairoto, Kenyan Meteorological Services, Kenia) and organise a seminar on *Post 2012: What Does the South Think?* (Ghent, 2 March 2006). Several Belgian negotiators, civil servants and civil society actors reserved time to discuss their point of view.

Throughout the course of the project, the advisory committee met three times to discuss intermediary results (October 2005, March 2006, September 2006). A seminar to discuss the preliminary results of the project (Brussels, 20 June 2006), with participation from policy-makers and civil society actors, proved helpful in giving final guidance. The researchers would like to thank the following persons for their cooperation: Roger Aertsens, Preeti Bhandari, Jos Buys, Bram Claeys, Arnold Jacques de Dixmude, Marc De Poortere, Elisabeth Ellegaard, Geert Fremout, Els Hertogen, Tine Heyse, Patrick Hollebosch, Patricia Grobбен, Bernard Mazijn, Mieke Pieters, Leida Rijnhout, Wendel Trio, Hans Van de Water, Vincent Van Steenberghe, Joshua Wairoto and Peter Wittoeck.

Chapter 1. Evolutions in the scientific and political debate: slowly taking into account development concerns

This first chapter gives a comprehensive overview of some important evolutions in the debate on climate change, equity and sustainable development over the last decade. It paints a broader historic picture behind the concerns and interests of developing countries for the post 2012 period, that will be the subject of the rest of the research report. The first paragraph (1.1.) goes into the scientific debate on climate change and the way the framing of this debate is slowly evolving. The second paragraph (1.2.) analyses the way equity and sustainable development have been integrated in the UNFCCC and the Kyoto Protocol, and presents the last evolution since COP11 and COP/MOP1 in Montreal, November-December 2005.

1.1. The evolving frame of climate science

While there were already signs of potential impacts of human activities on the global climate in the seventies, it is safe to say that climate science really took off in the middle of the eighties. In late 1988, the Intergovernmental Panel on Climate Change (IPCC) was set up by the United Nations Environmental Programme (UNEP) and the World Meteorological Organisation (WMO) with the objective of assessing scientific, technical and socio-economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation. The IPCC has since then become the main reference in climate science, in particular through the publication of three comprehensive Assessment Report in 1990, 1996 and 2001, which try to make an overall assessment of the knowledge available on climate change. A fourth Assessment Report is due for 2007. The IPCC has furthermore issued technical papers and special reports on topics such as regional impacts, emissions scenarios, technology transfer, carbon capture and storage. There have been several attempts at commissioning a Special Report or a more low-profile Technical Paper on the linkages between climate change and sustainable development, but no agreement could be reached by IPCC delegations (Najam et al., 2003; Swart et al. 2003).

Still, over the years, questions of equity and sustainable development have slowly entered the scientific discourse on climate change and sustainable development. Figures 1.1. and 1.2. show graphically how the discussion has evolved over the last decade and a half. The First Assessment Report (FAR) of the IPCC focused mainly on the left-hand half of figure 1.1., i.e. the strict climate domain of emissions, concentrations and impacts on the climate system. This focus can be explained mainly by the fact that in the late 1980s climate change was framed by natural scientists as a problem of long-term disturbance of the global geo-biochemical cycles and the associated effects on global

climatic patterns. Climate change was divorced from its social context and normative aspects were largely ignored (Swart et al. 2003).

The Second Assessment Report (SAR) further refined the analysis of the climate system and added an analysis of impacts on human and natural systems. The new set of questions which were incorporated related in particular to the cost-effectiveness of potential policies. The analysis was driven directly or indirectly by the question of what is the most cost-effective amount of mitigation for the global economy (Banuri et al. 2001). SAR also included an important chapter on equity, reflecting on the impacts of climate change and mitigation policies on global welfare as a whole, but also on the effects of climate change and mitigation policies on existing inequalities among and within nations (ibid.) (top right-hand quadrant of figure 1.1).

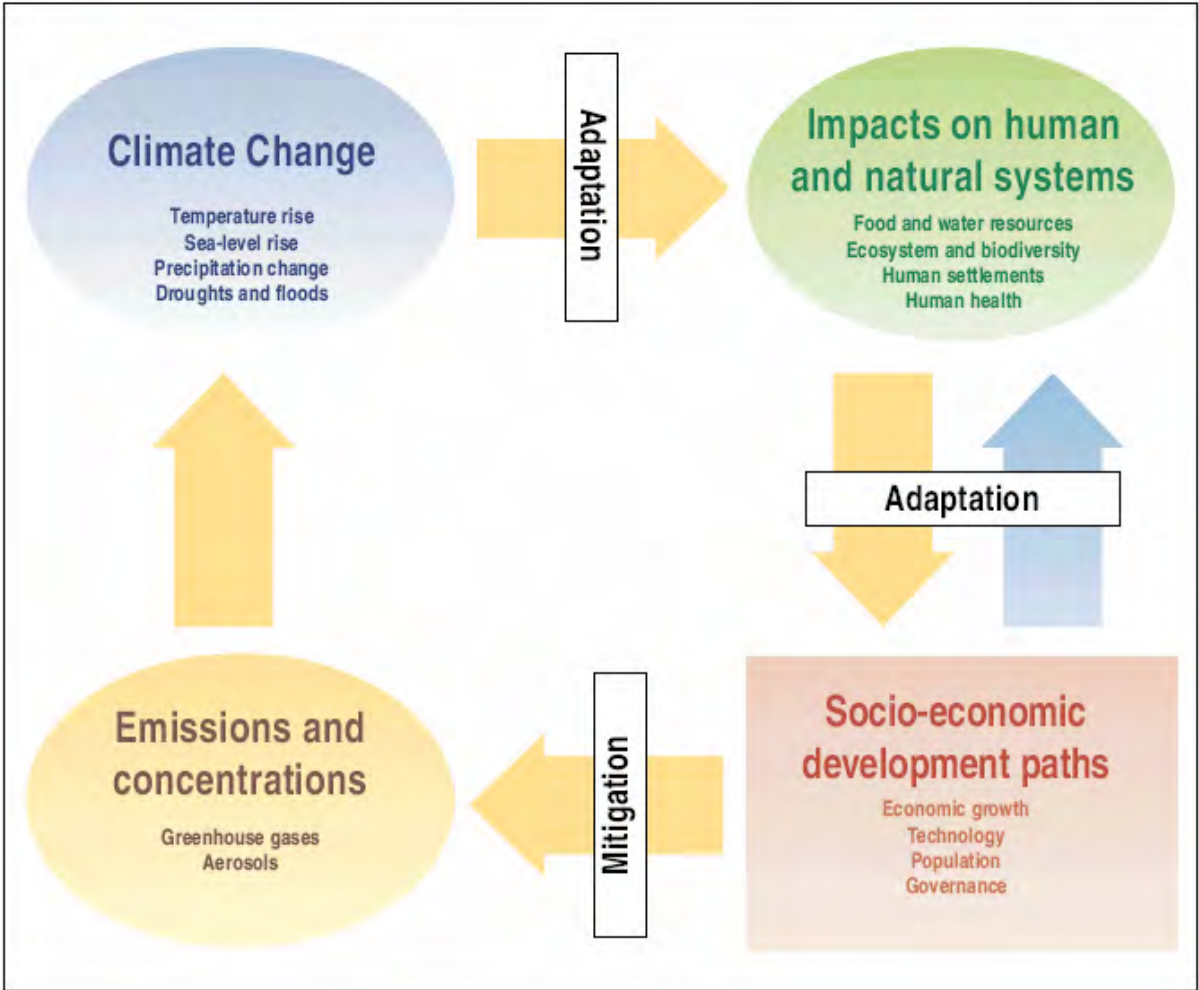


Figure 1.1. An integrated framework for analysing climate change. This figure illustrates that the various dimensions of the climate change issue exist in a dynamic cycle, characterized by significant time delays. Both emissions and impacts, for example, are linked in complex ways to underlying socioeconomic and technological development paths. A major contribution of the TAR has been to explicitly consider the bottom right-hand domain by examining the relationships between greenhouse gas emissions and development paths and by assessing preliminary work on the linkage between adaptation, mitigation, and development paths (Source: IPCC 2001).

In the Third Assessment Report (TAR), evidence on the physical processes at work in the climate system and the associated impacts were strengthened, cost-effectiveness returns throughout the whole analysis and equity “began gaining a little more prominence as a new focus of the assessment process” (Najam et al. 2003). The broader treatment of climate issues in TAR in an equity and sustainable development context remains restricted to a few chapters (Swart et al. 2003). In the Working Group II report on impacts, adaptation and vulnerability, some of the chapters make links to issues of equity and sustainable development, in particular chapters 1, 2, 3 and 18 (McCarthy et al. 2001). In the Working Group III report on mitigation it is in particular chapter one on “Setting the Stage: Climate Change and Sustainable Development” which extensively discusses these issues.

What has attracted a lot of attention in TAR is the introduction of alternative development pathways and the research into linkages between sustainable development, climate change, mitigation and adaptation. TAR clarifies that different policy choices in socio-economic development – energy mix and infrastructure, transport infrastructure, industrial activity etcetera – have important consequences for future GHG emissions, independent from whether climate policies are implemented (bottom right-hand quadrant). It thus continues the line of thinking which had started with the IPCC’s *Special Report on Emission Scenarios* (SRES, Nakicenovic and Swart 2000) and which recognises that the general development path of society is a determinant of GHG emissions at least as important as explicit climate policy. The TAR states that a growing scientific literature recognises that the historical model of industrial societies can no longer serve as the central notion of what constitutes “development”. Alternative development pathways have to be investigated in order to be able to achieve global prosperity in an environmentally and socio-economically sustainable world (Banuri et al. 2001). However, the analysis of these alternative development pathways had only just started and the TAR recognises that it does not yet achieve a fully integrated assessment of climate change, since not all components of the cycle were able to be linked dynamically (IPCC 2001)².

Swart et al. (2003) remark that the natural science-based establishment of the IPCC by UNEP and WMO rather than by a more development-oriented organisation contributes to the slow pace of change in IPCC. Embedment in a more development-oriented organisation would have guaranteed more involvement of social scientists. Najam et al. (2003) add that it is in particular developing country scholars who have been making the case for linkages between climate change, equity and sustainable development most strongly. The substantive argument here is the intellectual recognition that sustainable development can be both a framework condition and a motor for the better implementation of climate policy. There is, however, an institutional argument as well, i.e. the growing awareness that the IPCC has lagged far behind the conditions and principles laid down by the UNFCCC and the importance accorded by the UNFCCC to sustainable development. Agarwal et al. (1999) have argued that for the writing of FAR and SAR, too few developing country scientists were involved: “Even in institutions designed to be ‘global’, such as the intergovernmental Panel on climate Change (IPCC), there is an enormous disparity in North-South participation” (p. 31). In the case of SAR e.g., 342 US scientists were involved, 90 UK scientists, 24 Indian scientists and 15 Chinese scientists. In particular

² The concept of alternative development pathways is further developed in Chapter 3.

in WG II and WG III the representation of developing country scientists is much better balanced for the Fourth Assessment Report (AR4).

At its 20th Session (February 2003), the IPCC endorsed the use of cross cutting themes in the AR4 and agreed on a preliminary list of seven cross cutting themes, sustainable development being one of them. The concept paper which was prepared for the discussions (Srivastava and Heller, 2003) emphasises that the links between climate change and sustainable development are two-way. The most commonly stressed link runs from climate change to sustainable development: the impacts of climate change alter the environment in which development takes place or can take place. Climate change thus leads to constraints on emissions (which necessitates mitigation policy) and has impacts on vulnerable people and ecosystems (which necessitates adaptation policy). The other approach runs from sustainable development to climate change and emphasises that climate effects are in fact outputs of mainstream political and economic policies: (sustainable) development policies are a main determinant of emissions, and they have also important impacts on the vulnerability of people and ecosystems. A more sustainable development pattern would then ease mitigation and adaptation policies. The concept paper ends by stressing that realising the integration of sustainable development and climate change “requires the involvement of new classes of analysts and new disciplinary perspectives from across social, legal and organisational sciences” (ibid., 7).

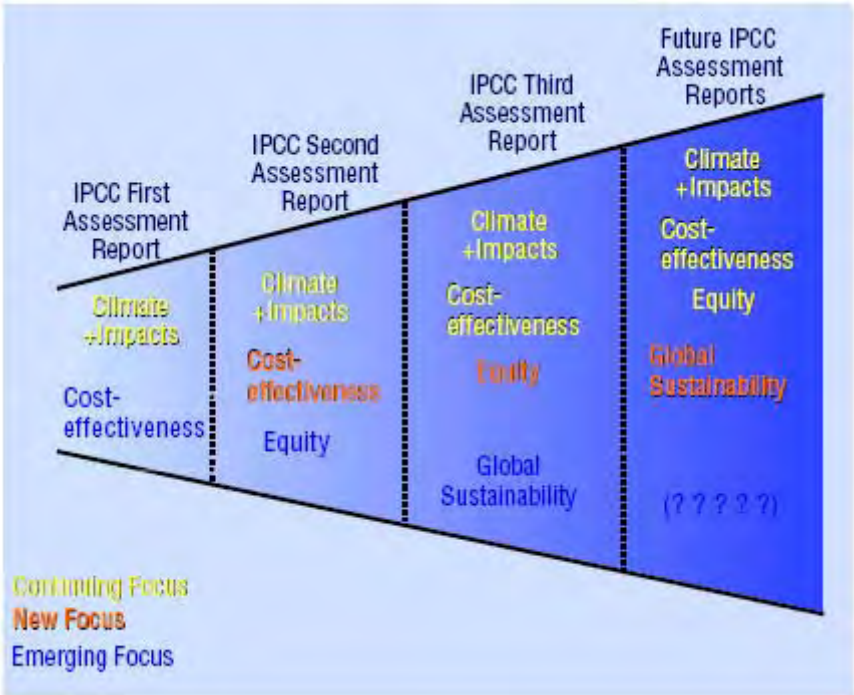


Figure 1.2. Evolution of the IPCC assessment process

The outline for the Working Group III contribution (on mitigation) to AR 4 contains an introduction and a first chapter on the framing of climate change. This illustrates the evolution in climate science that climate change and its impacts cannot be separated from normative considerations, such as considerations on equity and sustainable development. The scientists involved in these discussions often make an explicit link between the scientific framing of the climate debate and the difficult political

negotiations under the UNFCCC and Kyoto Protocol. They claim that formulating climate change as a primarily environmental problem with add-on social and economic dimensions, is not very helpful in figuring out how to respond politically, because it ignores the human dimensions of the problem and the difficult and locally differentiated politics of responding to it (Cohen et al. 1998). However, linking climate change to sustainable development and framing the debate as a problem of general development pathways “might represent a promising way (...) to connect the science to policy, widen the negotiating space, and break the deadlock” (Swart et al. 2003, S35). Metz et al. (2002) think this will also appeal to developing countries, as they may acknowledge that the quest for a more sustainable development pattern and the implementation of climate change mitigation and adaptation strategies can mutually reinforce each other. The next paragraph goes deeper into the political response to climate change since the signing of the UNFCCC, and looks in particular at questions of equity and sustainable development.

1.2. The political response to climate change, 1992-2012

Already in 1979, the first WMO sponsored World Climate Conference in Geneva stated that anthropogenic carbon dioxide emission could have a long-term impact on climate. This was still mainly a scientific conference, but following the call of the World Commission on Environment and Development³ in their 1987 report *Our Common Future* that “governments should initiate discussions leading to a convention” on the problem of climate change (WCED 1987, 177), things began to speed up politically. A 1988 UN resolution recognised climate change as a “common concern of mankind”⁴ and a 1989 UN resolution called for the development of a framework convention on climate change, also setting up a preparatory committee⁵. This resolution already referred to the historical responsibility of developed countries for the climate problem and recognised the need for new and additional financial resources and technology transfer. A number of intergovernmental conferences focusing on climate change were held between 1988 and 1990 which further helped to raise international concern about the issue. The second World Climate Conference in Geneva (29 October to 7 November 1990) was the last important step to formal negotiations. During the first part of the conference, scientists highlighted the risks of climate change, while during the second part national delegations worked towards a political declaration, which noted amongst other things the principle of equity, the principle of common but differentiated responsibilities, the concept of sustainable development and the precautionary principle (UNFCCC, s.d. (b)).

On 21 December 1990, the UN General Assembly approved the start of treaty negotiations. The Intergovernmental Negotiating Committee for a Framework Convention on Climate Change (INC/FCCC) met for five sessions between February 1991 and May 1992, with the aim of negotiating a convention before the June 1992 UNCED conference in Rio de Janeiro. Negotiators from 150 countries finalized the Convention in just 15 months. It was adopted in New York on 9 May 1992

³ Better known as the Brundtland Commission.

⁴ General Assembly Resolution 43/53, 6 December 1989.

⁵ General Assembly Resolution 44/228, 22 December 1989.

(UNFCCC, s.d. (b)).

The purpose of the Convention is to provide a framework for action to achieve stabilization of atmospheric concentrations of greenhouse gases (including carbon dioxide, methane and nitrous oxide) in order to avoid “dangerous anthropogenic interference” with the climate system (Article 2 UNFCCC). The treaty was opened for signature in June 1992 at the UN Conference on Environment and Development in Rio de Janeiro and entered into force on 21 March 1994. Today, it has 189 parties. The treaty has established an ongoing process of discussion and information exchange on a global scale within the annual Conference of the Parties (COP) and the biannual meetings of two subsidiary bodies (for implementation and for scientific and technological advice). At the third session of the COP in 1997 in Kyoto, delegates adopted a Protocol in which developed countries and countries in transition to a market economy committed themselves to legally binding emission reduction targets. The Kyoto Protocol (KP) entered into force on 16 February 2005 and has been ratified so far by 163 parties. Major non-ratifiers among the Annex I parties are the US and Australia. The negotiations on the rules and operational details of the KP (determining how Parties will reduce their emissions and how they will measure reductions) are part of an ongoing process. In this section, we particularly focus on the equity aspects of the two treaties.

1.2.1. Equity provisions in the UNFCCC and Kyoto Protocol

In this report, the term ‘equity’ is used differently from its common meaning in international law as a general principle of law and a tool for the application and interpretation of the law. Although no universally agreed (legal) definition of equity exists, the concept has been characterized as “considerations of fairness, reasonableness and policy often *necessary for the sensible application of the more settled rules of law*” (Brownlie, 1979). It is important to note that the application of equity relevant to one context cannot automatically be transposed and applied to other contexts (e.g. the climate change context): all depends on the legal and factual circumstances of each case (Yamin, 1999).

For this research project, we take on a different approach. We consider ‘equity’ related to climate change as a notion which encompasses different dimensions: historical responsibility, equal rights, capacity to act, basic needs, etc. In this section, we attempt to examine to what extent the UNFCCC and the KP take these different dimensions of equity into account. Although subject to criticism (*infra*), the international climate change agreements that exist today, already contain several provisions that contain equity considerations.

1.2.1.1. UNFCCC

Equity has been recognized in the UNFCCC, both in the principles and the subsequent commitments of the treaty, where numerous distinctions are made between developed and developing countries. Referring to the historical responsibility of developed countries and basic needs of developing

countries, the *Preamble* to the treaty notes that: “the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs”.

1.2.1.1.1. Principles

Article 3.1. is one of the rare articles in international law that *explicitly* refers to equity. It states that «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.» The reference to the common but differentiated responsibilities of the Parties implies that although every state has a responsibility to protect the climate system, developed countries have a greater responsibility in doing so, because of their larger green house gas (GHG) emissions. Again, themes like *historical responsibility* and also *capacity to act* are, at least to some extent, being considered here.

There is a continued differentiation in *Article 3.2.* which provides that the specific needs and special circumstances of developing countries should be given full consideration (cf. *basic needs*).

Furthermore, *Article 3.4.* and *3.5* urge the Parties to promote sustainable development and sustainable economic growth, while referring to the specific conditions of each Party and the particular situation of developing country Parties.

1.2.1.1.2. Commitments

Consequently, the commitments in article 4 are also differentiated (cf. *historical responsibility* and *capacity to act*). Reiterating their common but differentiated responsibilities, all Parties take on reporting duties (*Article 4.1*), but only developed country Parties commit themselves to reduce their GHG emissions (i.e. the so-called Annex I group) (*Article 4.2*). Within this group, the countries with economies in transition⁶ are entitled to a certain degree of flexibility in choosing their own base year (*Article 4.6*). However, the group of rich industrialised countries (i.e. the so-called Annex II group) has the additional obligation to provide technical and financial assistance to developing countries in order to help them implement the provisions of the treaty and in order to help the specifically vulnerable developing country Parties cope with climate change (*Articles 4.3, 4.4 and 4.5*). Non-Annex I countries⁷ only have obligations to minimise emissions where possible.

In this context, it is particularly important to note *Article 4.7.* which specifies that the implementation by developing countries of their commitments will depend on the effective implementation by developed country Parties of their commitments regarding financial and technological transfer.

⁶ Countries that are undergoing the process of transition to a market economy.

⁷ Generally called *developing countries*, although the group includes some OECD members (Mexico and Korea), and relatively high income countries, such as Singapore and Saudi Arabia (Metz et al., 2002).

Finally, in the implementation of their commitments, all Parties shall take into account the interests of developing countries that are particularly vulnerable to the effects of climate change (*Article 4.8.*), of least developed countries (*Article 4.9.*) and of countries whose economies are highly dependent on fossil fuels (*Article 4.10.*).⁸ (cf. *capacity to act* and *basic needs*).

1.2.1.1.3. Procedural equity

The UNFCCC also contains a certain degree of procedural equity. Due to the absence of a formal agreement on the rules of procedure concerning decisions⁹ and because, de facto, every Party has one vote, a *decision-making process* has emerged that is largely based on the *consensus* of all parties. This implies that in reality, objections to a decision are often vetoes. Sometimes, however, the regime has applied a 'consensus minus x' voting procedure and examples exist where the objections of small groups have been overruled in the ultimate agreement (Barnett et al., 2002). For example, a 'consensus minus x' approach was used to adopt the Geneva Ministerial Declaration¹⁰ at the end of COP 2, despite the protest of 14 OPEC Countries and Russia.¹¹ According to some authors, taken together with the coordination of developing countries in the G77/China group, the generally applied consensus-based decision making system also reduces the risk of dominance by the OECD countries (Metz, 2000).

Article 11.1. of the convention established a mechanism for the financial support of developing countries through grants or on a concessional basis, the management of which was later entrusted to the Global Environment Facility (GEF). *Article 11.2.* requires this financial mechanism to «*have an equitable and balanced representation of all Parties within a transparent system of governance*».

Other aspects of procedural equity in the climate change regime that are cited in literature (Metz, 2000) include the open ended Subsidiary Bodies, the regional representation rules in the Bureau of the COP, the transparent system of national communications and the advanced availability of proposed amendments.¹²

⁸ *Article 4.8.* has a wider scope than *Article 4.9.*, which specifically focuses on funding and technology transfer. *Article 4.10* highlights the economic aspect of differentiation.

⁹ Amendments, however, are adopted with a ¾ majority (*Article 15.3.* UNFCCC) (Metz, 2000).

¹⁰ In the Declaration, the Ministers and "other heads of delegations" (note the missing 'the') acknowledged the 2nd IPCC Assessment Report as a scientific basis for "urgently strengthening action" and instructed the ad hoc group on the Berlin Mandate to accelerate the negotiations.

¹¹ The Ministers who had signed the Declaration wanted COP 2 to "take note of it", but it was clear that OPEC Members and Russia (supported by Australia) would attempt to block such move in the COP. Because the greater part of countries wanted to go ahead with the Declaration, a solution was found in the form of adopting the Declaration by 'consensus minus x'. At the suggestion of the COP President, the large majority of delegations took note of the Declaration in the final plenary meeting. Attempts to protest against the procedure were lost in the sustained applause by the majority of delegates. The opponents could still object to the Declaration, but they could not prevent its formal recognition by COP 2 (Oberthür et al., 1999).

¹² *Article 15.2* UNFCCC states that "*the text of any proposed amendment to the Convention shall be communicated to the Parties by the Secretariat at least six months before the meeting at which it is proposed for adoption*".

1.2.1.1.4. Funds under the UNFCCC

The so-called Bonn Agreements, adopted during COP 6bis in 2001, created two new voluntary funds under the UNFCCC, that are managed by the GEF: the Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (LDCF). The SCCF will finance projects relating to adaptation; technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management; and economic diversification. On the First Pledging Meeting of potential donors at COP 10 (December 2004) USD 34.7 million was *pledged*. On the other hand, the LDCF will support a work programme to assist LDCs to carry out, inter alia, the preparation and implementation of national adaptation programmes of action. In april 2005, the total receipts amounted to USD 32.9 million and USD 11 million was already approved for projects, fees and administrative budgets.

1.2.1.2. Kyoto Protocol (KP)

The UNFCCC does not contain any legally binding emission reduction targets. These were agreed upon in the KP, adopted at COP 3 (1997). The KP can be viewed as a phase in the ongoing negotiation process, since its reduction targets have only been set for a commitment period which commences in 2008 and continues until 2012. The *differentiation* of the UNFCCC (supra) logically continues in the KP which also distinguishes between developing and developed country Parties.¹³

1.2.1.2.1. Articles¹⁴

The rich industrialised countries and countries with economies in transition¹⁵ listed in Annex B of the protocol¹⁶ agreed to reduce their collective GHG emissions in the first commitment period (2008-2012) by an average of at least 5 % compared to 1990 levels (*Article 3.1*). Again, one could argue that themes like *historical responsibility* and *capacity to act* are, at least to some extent, being considered. However, Najam et al. criticise the decision to set emission targets as a *percentage* of 1990 emissions (rather than as an allowance of emissions per capita), because this creates an allocation precedent that actually benefits countries with high current emissions (rather than those with low current emissions). It is feared that this precedent will shape future decisions regarding reduction goals for developing countries, which would be detrimental to their interests because in that case they would be burdened with much lower emission allowances than industrialised countries with high current emissions (Najam et al., 2003).

¹³ Moreover, the Preamble of the KP makes a reference to *Article 3* UNFCCC, which implies that the principles of this article are also applicable in the context of the KP.

¹⁴ Unlike the UNFCCC, the Articles of the KP do not have separate titles.

¹⁵ Referring to *Article 4.6*. UNFCCC, *Article 3.6*. KP again allows a certain degree of flexibility to countries undergoing the process of transition to a market economy, in the implementation of their commitments other than those under *Article 3* KP.

¹⁶ The Annex B group of countries is largely the same as the Annex I group in the UNFCCC, except for Turkey and Belarus, which are not included in the Annex B group, and Kazakhstan, which voluntarily joined Annex B.

Consistent with the Berlin Mandate¹⁷ adopted at COP 1 (1995), developing countries rejected any binding commitments at COP 3, stating that the responsibility for climate change was not theirs, that they had less financial ability to pay and that they had more pressing needs to spend their limited resources on (Cazorla et al., 2000). Therefore, they argued, actual reductions should first be realised through the protocol, before additional commitments for developing countries could be discussed (Metz et al., 2002).

Within the Annex I group, the general emission reduction commitment obviously also had to be redistributed on an equitable basis. However, even after prolonged debates and although several burden sharing proposals were formulated (Ringius et al., 2002), no agreement on a systematic approach could be reached. In the end, a strictly political deal was made (Metz et al., 2002). In other words, the differentiated targets were not based on a standardized formula that considers e.g. efficiency or equity, but on bargaining power and stated willingness¹⁸ during complex negotiations. As a result, it is not entirely clear why Japan, for example, must reduce its emissions by 6 percent, while Australia may increase emissions by 8 percent.

In addition, *Article 4 KP* offers groups of countries the opportunity to negotiate a redistribution of their collective GHG reduction commitments. The EU took this opportunity and finalised an internal burden sharing agreement in 1998. Unlike the differentiation within the Annex I group of the KP, the EU approach was more transparent and clearly did take into account some principles of fairness (Metz et al., 2002). This so-called *Triptych approach* is based on the division of the economy into three sectors, for each of which different equity principles (in this case *need, capability* and *responsibility*) are applied. The fact that an agreement was reached might even be encouraging for future negotiations: although it covered only 15 countries, the process incorporated all the complexities of an Annex I group since the EU member states also widely differed in energy and economic characteristics (Metz, 2000).

Besides this differentiation in emission reduction commitments, the KP contains some other provisions that address equity aspects. Both *Article 2.3* and *Article 3.14 KP* demand Annex I countries to minimise *adverse effects* of the implementation of their treaty obligations on developing country Parties, especially those mentioned in Articles 4.8 and 4.9 UNFCCC. These negative effects refer both to the physical effects of climate change, as well as the economic impacts of emission reduction measures on energy exporting countries. This issue is rather complex, as there are tensions between means to minimise the adverse effects of climate change and means to minimise the impacts of emission reduction efforts on certain economies. For instance, OPEC has argued that the latter should include monetary compensation for lost oil revenues, but this basically obstructs progress on assistance to developing countries for climate change adaptation and also reveals a conflict of interests within the G77/China group (Barnett et al., 2002).

The KP also establishes three flexible mechanisms which should help Annex I countries in meeting their national targets in a cost-effective manner: an Emissions Trading system, Joint

¹⁷ The objective of the 'Berlin Mandate' was to initiate a series of intergovernmental negotiations on a protocol to the UNFCCC (or another legal instrument) that would strengthen and reaffirm the existing commitments of the industrialised countries. The process was not intended to introduce any new commitments for non-Annex I parties. Decision 1/CP.1 (FCCC/CP/1995/7/Add.1).

¹⁸ See Chapter 5.

Implementation of emission-reduction projects between Annex I Parties and finally the Clean Development Mechanism (CDM). *Article 12 KP* deals with the establishment of the CDM, which - in theory - is a practical application of equity principles, such as capacity to act and basic needs considerations. The goals of the CDM are twofold: to help Annex I Parties in complying with their reduction commitments, and to achieve sustainable development in the developing (host) country. Indeed, the CDM will allow certified emission reductions generated by sustainable development projects in developing countries to be used by the Annex I Parties who invest in these projects. *Article 12.8.* provides that a mandatory fee on each project shall be used to help particularly vulnerable countries adapt to the negative effects of climate change (via the Adaptation Fund, *infra*). However, since this form of taxation only exists for the CDM and not for the other two flexible mechanisms, the former is put at a (financial) disadvantage. Another point of concern is that countries where industrial dynamics are low (e.g. small countries in Africa) apparently fall by the wayside when it comes to attracting CDM-projects. Finally, while some argue that the CDM could contribute significantly towards shifting development in developing countries into a more sustainable direction (Metz et al., 2002), others criticise the mechanism because, like other flexible mechanisms, it reduces the incentive for domestic action (Byrne et al., 2002).

Other examples of articles that *differentiate between developing and developed countries* are *Article 5.1.* (obligation of Annex I Parties to establish a national system for the estimation of anthropogenic emissions by sources and removals by sinks for all greenhouse gases not controlled by the Montreal Protocol), *Article 10* (continuing to advance the implementation of existing commitments) and *Article 13 (4), c – d KP* (COP/MOP shall make the necessary decisions to promote the effective promotion of the KP).

1.2.1.2.2. Funds under the KP

The Bonn Agreements also created the Adaptation Fund (AF), which will support the implementation of concrete adaptation projects and programmes, including avoidance of deforestation and combating land degradation and desertification. The Fund is also managed by the GEF¹⁹ and became operational with the entry into force of the Protocol on 16 February 2005.²⁰ The GEF is expected to initiate steps to mobilize resources for the Fund.

1.2.2. Political evolution?

Although equity considerations and sustainable development are clearly part of the current regime, one can hardly claim that they have been in the centre of political attention so far. This is partly

¹⁹ In decision 10/CP.7, the COP decided that the Adaptation Fund shall be operated and managed by an entity entrusted with the operation of the financial mechanism of the Convention, under the guidance of the COP/MOP. See: <http://www.gefweb.org>

²⁰ The Protocol was ratified by 140 countries that account for most of global emissions from industrialized nations. Concentration of carbon dioxide now stands at 372 parts per million, higher than at any time in at least the past 420,000 years (David King, chief science advisor to the British Government.)

because in recent years, a lot of attention and energy went to the ratification process by *Annex I countries*. Unless a sufficient number of them ratified the KP, the climate regime could not become fully operational. Some claim this divergence of energy has led to a marginalization of developing country concerns (Najam et al., 2003). Now that the protocol has finally entered into force in February 2005, southern concerns might become more prominent, consistent with the long-term objectives of the UNFCCC (e.g. those related to sustainable development). Obviously, this has also to do with the fact that current Annex I countries realise that the problem of climate change cannot be solved by themselves alone and that some kind of “participation” of (certain) developing countries will be needed in the future. Although in any case this “participation” will first and foremost depend on the observance by Annex I countries of their current commitments, any form of “participation” will only be obtained by seriously taking into account developing country concerns. Already, the attention for e.g. adaptation and technology transfer is increasing in international negotiations.

1.3. The start of the post-2012 debate

Since the current commitments under the KP are not sufficient to *prevent* dangerous climate change – the ultimate goal of the climate change regime, enshrined in art. 2 UNFCCC – nor to *adapt* to unavoidable climate change, a ‘global response’ to deal with climate change will be necessary. At the same time, different concerns and interests from industrialised and developing countries will have to be taken into account. For instance, industrialised countries emphasize that the *share* of the Kyoto ratifiers in global emissions, which was about 30% in 2000, is expected to decrease substantially in the years to come, thus shifting an increasing part of the responsibility to developing countries. Developing countries generally counter this argument with reference to huge differences in *per capita* emissions between developed and developing countries. Whether developing countries will be willing to participate in one form or another in a post-2012 regime, will depend on amongst other things whether the current commitments under the KP will be fulfilled, what the features of the post-2012 regime are and whether these will sufficiently take into account developing countries’ concerns and interests.

In this section we investigate the current state of the political debate on the post-2012 period. Before the Montreal conference (COP 11²¹ and COP/MOP 1²², November-December 2005), the post-2012 talks were not part of the official negotiations, despite some earlier efforts of the EU to put this topic on the agenda (Wittneben et al., 2006). Negotiations at COP 10 in Buenos Aires (December 2004) did lead to the informal ‘Seminar of Governmental Experts’ (SoGE, Bonn, May 2005), but this meeting was not *formally* connected to the negotiation process (Ott et al., 2005). Since the Montreal climate summit, official talks on the future regime are being held along several negotiation tracks, which are presented below. For the moment (June 2006), there are only two official tracks: the Kyoto track under Article 3.9 KP and the Convention track, which is a dialogue on long-term cooperative

²¹ The Eleventh Conference of the Parties to the Framework Convention on Climate Change.

²² The First Conference of the Parties (to the Convention) serving as the meeting of the Parties (to the Kyoto Protocol).

action to address climate change. However, a number of additional tracks might emerge in the future based on Article 9 KP and on two proposals by the Russian Federation and Papua New Guinea.

1.3.1. The Kyoto track

1.3.1.1. Article 3.9 KP

1.3.1.1.1. COP/MOP 1

Article 3.9. KP states that “*commitments for subsequent periods for Parties included in Annex I shall be established in amendments to Annex B to this Protocol, which shall be adopted in accordance with the provisions of Article 21, paragraph 7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall initiate the consideration of such commitments at least seven years before the end of the first commitment period referred to in paragraph 1 above*”.

Although the text of Article 3.9. KP is carefully-worded (“*initiate the consideration of such commitments*”), it contains a clear obligation (“*shall*”) for the Parties to the Protocol during their first meeting after the entry into force of the Protocol. The fact that this first meeting happened to fall in the same year when according to Article 3.9, negotiations on future commitments had to be initiated at the latest (2005, or 2012 minus seven years), is a mere coincidence, basically caused by the slow ratification process in Russia. (Müller, 2006). In any case, during MOP1, a separate contact group on Article 3.9. KP was formed.

Two basic points of contention surfaced during the discussions within the contact group (Wittneben et al., 2006). First, the G-77 and China on the one hand and the EU and Japan on the other hand, differed on *procedural issues*, such as the institutional body or timeline for negotiations. The former were in favour of a strict and rather limited timeline (ending in 2008), arguing that they considered Article 3.9 to constitute a test of the willingness of industrialised countries to take the lead in combating climate change. The second point of contention was the question *which countries* should take on *new commitments* with regard to further emission reductions. Because of the reference to the Parties included in *Annex I* of the UNFCCC, Article 3.9. KP is quite clear in the sense that it only allows for an agreement on new commitments for *current* Annex I countries. On the basis of this article, no new commitments to take on legally binding emission reduction targets for the post-2012 period can be legally²³ introduced for non-Annex I Parties, not even for those which are today considered as major emitters (e.g. China). Most industrialised countries however, wanted to broaden the post-2012 process to also include non-Annex I Parties, and tried to include a *reference* to Article 9 KP (overall review of the Protocol, *infra*) in the deliberation mandate on Article 3.9 KP, which led to strong opposition by the G-77 and China. Eventually, the industrialised countries accepted that Article 3.9 KP did not provide the right forum to discuss broader participation and it was agreed to form a

²³ Theoretically, first an amendment of the UNFCCC would be required to change the composition of the Annex I list, after which new reductions commitments would have to be established by amending Annex B of the KP.

separate, parallel *group* to discuss a broader review of the Protocol under Article 9 KP, with industrialised countries aiming at a separate decision concerning this article. Discussions in one group were dependant on progress made in the other.²⁴

Near the end of the talks on Article 3.9 KP however, the Russian delegation at COP/MOP 1 raised concerns that the draft decision on that article lacked wording on *voluntary commitments* and insisted to include a provision in the deliberation mandate to give non-Annex I Parties the opportunity to take on *voluntary reduction targets* (Müller, 2006). As mentioned earlier, since Article 3.9 KP explicitly refers only to Annex I countries, this is legally not possible (Wittneben et al., 2006). The COP/MOP 1 eventually tried to meet the Russian Federation's concerns part of the way by requesting the COP/MOP President to hold consultations on the issue of voluntary commitments and to report his conclusions to the COP/MOP 2 in Nairobi in November of this year (Wittneben et al., 2006). This so-called "Russian Proposal" on voluntary commitments for developing countries might eventually lead to yet another negotiation track.

Regarding Article 3.9. KP, the COP/MOP 1 ultimately decided²⁵ to initiate without delay a process in an *open-ended Ad Hoc working group* of Parties to the Kyoto Protocol to consider further commitments by Annex I countries for the Post-2012 period. Such a type of working group has the advantage that it can meet more frequently than the COP/MOP and at the same time can have its own agenda and chair, which makes it easier to focus on the mandated issue at hand (Wittneben et al., 2006). At every future COP/MOP, the ad hoc working group will report on the state of affairs of the negotiations. The G-77 and China dropped their 2008 timeline in exchange for the included guarantee that the second commitment period should immediately follow the first. It is estimated that it will take at least two years to finalise the ratification process for the new commitments (Wittneben, 2006).

1.3.1.1.2. Recent developments

The open-ended Ad Hoc working group (AWG) under the KP met for the first time from 17-25 May 2006, together with the twenty-fourth sessions of the Subsidiary Bodies of the UNFCCC (SB 24). Parties were invited to submit their views on the AWG by 15 March 2006 to the UNFCCC Secretariat. Eight Annex I Parties (a.o. the European Union, Japan, Canada, New Zealand) and five non-Annex I countries (a.o. China, India) sent in their submissions.

During this first session of the AWG, it soon became clear that although Annex I and non-Annex I countries both endorsed the core elements of the above-mentioned COP/MOP 1 decision (e.g. no break between the 1st and 2nd commitment period), they also differed on several issues (Grobbe, 2006). To begin with, Annex I countries in general see this particular process under the KP as part of a broader context and, departing from a discussion on the long-term goal of the UNFCCC, want to talk about a 'global response'. Non-Annex I countries on the other hand tend to hold a strict interpretation of the COP/MOP 1 decision: they believe the AWG should only deal with determining new reduction

²⁴ Earth Negotiations Bulletin, Vol. 12, No. 291.

²⁵ Decision 1/CMP.1 Consideration of commitments for subsequent periods for Parties included in Annex I to the Convention under Article 3, Paragraph 9, of the Kyoto Protocol.

commitments and a new commitment period for Annex I countries. Secondly, Annex I countries want to base any further commitments on the best available scientific and socio-economic information and analysis. Moreover, they first want to discuss the scientific basis for the determination of further commitments, before actually discussing concrete reduction figures. Non-Annex I countries want to work the other way around and oppose a common scientific and socio-economic analysis of necessary global reductions because they fear this might be a manoeuvre to delay talks on actual reduction figures. Thirdly, Annex I countries see several linkages between this process and (the progress made within) other post-2012 processes (e.g. the one for Article 9 KP). Non-Annex I countries however, claim that the AWG does not constitute the right forum to discuss results from other post-2012 processes. Non-Annex I countries furthermore assume that the task of deciding on the details of the second commitment period should be finished before a fixed date, preferably by 2008.

After lengthy debates and several bilateral and other consultations, AWG Chair Zammit Cutajar managed to reconcile these conflicting views in a final document concerning the planning on future work.²⁶ The agreement repeats that the discussions within the AWG will *focus* on the consideration of further commitments by Annex I Parties. However, at the same time it is also important to bear in mind relevant results from other Convention and Protocol bodies and processes. The AWG will work towards an agreement on further commitments by these Parties as soon as possible (“expeditiously”). In this regard, Annex I Parties need to gather and analyze information on scientific, technical and socio-economic issues (e.g. available from the IPCC) to improve understanding of the level of ambition of future commitments. Furthermore, the AWG’s plan of future work observes the relevance of a continued evaluation of the implementation of the first commitment period obligations. The text also contains a list of items that need to be discussed within the AWG (e.g. the scientific basis for the determination of further commitments, scenarios and associated risks, etc.) before turning to a negotiation on actual emission reduction figures (Grobben, 2006). The second session of the AWG will be held at COP/MOP 2 (November 2006, Nairobi), where an in-session workshop will be held with regard to the global context, with input from the IPCC. Parties are invited to present relevant information on emission trends, mitigation potential of policies and technologies, and cost-benefit analysis of emission reductions at the workshop. After this, the AWG will meet twice in 2007.

1.3.1.2. Article 9 KP

Article 9.1. KP states that the COP/MOP shall periodically *review* the KP “*in the light of the best available scientific information and assessments on climate change and its impacts, as well as relevant technical, social and economic information. Such reviews shall be coordinated with pertinent reviews under the Convention, in particular those required by Article 4, paragraph 2(d), and Article 7, paragraph 2(a), of the Convention (...)*.” The review required by Article 4.2(d) UNFCCC deals only with Annex I countries (adequacy of Annex I commitments), while the one required by Article 7.2(a) UNFCCC is not limited to Annex I countries (obligations of Parties in light of objective of the Convention). Article 9 KP as such contains an important link with the convention review. The first of

²⁶ FCCC/KP/AWG/2006/L.2/Rev.1

these reviews shall take place at the second session of the COP/MOP and further reviews will take place at regular intervals and in a timely fashion (art. 9.2. KP).

Article 9 KP is promoted by some Annex-I countries as the preferred track to discuss future commitments. A review of the KP will most likely reveal that current reduction commitments are insufficient to meet the goal of Article 2 UNFCCC and based on the scientific information indicating that emissions in non-Annex I countries are growing rapidly, this could also imply that the current list of Annex I countries has to be extended. This conclusion should also be reinforced by the results of the review under Article 7.2(a) UNFCCC. To extend the list of Annex I countries, an amendment of the UNFCCC is required.

As mentioned above, following discussions on Article 3.9 KP, a separate contact group on Article 9 was formed during COP/MOP 1 and progress in one group was closely linked to how discussions in the other group evolved. In the end, no separate (formal) decision was taken on Article 9 KP. However, the COP/MOP1 did agree to include in its report an invitation for parties to *submit relevant information and views* on how best to proceed under this article by 1 September 2006. The Secretariat will prepare a report on these submissions which will be presented to COP/MOP 2. Art. 9.2. KP is clear: the review of the KP is to start at COP/MOP 2. This process of informal discussions might eventually lead to a third track on the future of the climate regime.

1.3.2. The Convention track

1.3.2.1. COP 11

Early in the Montreal conference, COP President Dion took the initiative to launch a post-2012 process under the *Convention* with a proposal for *discussion on long-term cooperative action* to address climate change. Initially, a non-paper was circulated which drew attention to topics including environmental effectiveness, adaptation, advancing development goals sustainably, market based approaches and technology. The President proposed that discussions on these topics would take place in workshops and would be completed by COP 13. Later, the paper was formally circulated.²⁷ The motivation behind the proposal of the Chair was clear: a COP decision (i.e. under the *Convention*) makes it possible to cover a broader spectrum, both with regard to *contents* (including adaptation, technologies and development goals) and *participation* (including Parties to the UNFCCC which have not (yet) ratified the KP) (Wittneben et al., 2006).

Informal discussions on President Dion's proposal for action were held in yet a third contact group, beside the ones on Article 3.9 KP and Article 9 KP. At one point, the US delegation walked out of the negotiations, because they did not agree with the nature and direction of the process. This further complicated negotiations, because, as this was a process under the *Convention*, the US had to be included in any final COP decision. The US delegates later offered a counter-proposal to Dion's text

²⁷ FCCC/CP/2005/CRP.1

that heavily focused on technology and stressed the fact that the process should be “non-binding” and that negotiations on new commitments should a priori be ruled out (Maes, 2006).

In the end, Parties managed to reach an agreement. In a formal decision²⁸ on *dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention*, the COP first of all acknowledges that development and poverty eradication are still the predominant priorities of developing countries. A variety of approaches exists to address climate change, but the global nature of the problem necessitates “*the widest possible cooperation and participation in an effective and appropriate international response*”. The COP therefore agrees to engage in a *dialogue* to exchange views and experiences and analyse strategic approaches for long-term (i.e. post-2012) cooperative action. The four key thematic areas for this dialogue are: advancing development goals in a sustainable way, addressing action on adaptation, realizing the full potential of technology and realizing the full potential of market-based opportunities. The dialogue will take place in up to four workshops, which are to be held over the next two years, and which will report to COP 12 and COP 13. Although it can be deemed a success that the US was finally convinced to agree to some dialogue (Müller, 2006), the final COP decision can be considered rather weak (Wittneben et al., 2006). For instance, with regard to language, it merely speaks of a ‘dialogue’ instead of a ‘process’. Furthermore, due to pressure of the US delegation the decision requires that the dialogue should not prejudice “any future negotiations, commitments, process, framework or mandate under the Convention” (Wittneben et al., 2006). More importantly, the decision makes clear that the dialogue will be an open and non-binding exchange of views and will not open to any negotiations leading to new commitments.

However, given the initial position of the US and the G-77 and China, who were not very eager to discuss future action in the first place, this is most likely the best agreement that could be achieved (Wittneben et al., 2006). The dialogue will at least provide a forum for the exchange of views and information on post-2012 action (Wittneben et al., 2006) and may very well prove to be the place where developing countries can raise topics and bring on ideas that until now did not make it onto the official climate change agenda (Müller, 2006).

1.3.2.2. Recent developments

Parties to the UNFCCC were invited to submit their views on the dialogue by 15 April 2006 to the UNFCCC Secretariat. Eight Annex I Parties (a.o. USA, the European Union, Japan, Canada), seven non-Annex I countries (a.o. China, Brazil, South-Africa) and one business NGO sent in their submissions. These were discussed during the first *workshop of the dialogue*, which was held in Bonn, from 15-16 May, just prior to SB 24 (supra). The two-day meeting was led by two so-called co-facilitators (South Africa and Australia) who made clear that it was not a negotiation, but – in accordance with the COP 11 decision – a open and non-binding discussion.

²⁸ Decision 1/CP.11 Dialogue on long-term cooperative action to address climate change by enhancing implementation of the Convention.

First, all Parties were given the opportunity to explain their point of view on the issues that were to be discussed in the dialogue. Again, from the start, a rather clear distinction between Annex I and non-Annex I countries became apparent. The former (except the US and Australia) generally want to use the dialogue to talk about the long-term goal of the UNFCCC and about the fact that more parties should take on effective emission reduction measures, while the latter (largely represented by the G-77 and China) see the dialogue as a way to urge Annex I countries to live up to their UNFCCC commitments in areas such as technology transfer, financial resources, capacity building and the reduction of emissions (Grobben, 2006). For instance, Parties like Norway, Japan, the EU and Iceland stressed the need for a global response and called for the broadest possible cooperation, while China, Brazil, Saudi Arabia and the Philippines observed gaps in the implementation of the convention. For Canada, a link existed between the different Montreal 'tracks', but this was disputed by non-Annex I countries (Grobben, 2006). Ghana and Burkina Faso noted the link with the other Rio conventions and the latter also expressed the need for institutional capacity building for CDM. South Africa highlighted the 'positive incentives' approach to encourage and support action in developing countries across a number of activities and emphasized the importance of sustainable development policies and measures (SD-PAMS).

During the meeting, Parties also went more deeply into a number of issues, including the four thematic areas of the COP 11 decision. On *advancing development goals sustainably*, Parties, inter alia, noted the importance of integrating climate change policies in national and international (development aid) policies. Uganda voiced concerns that climate change was worsening global economic inequalities. Papua New Guinea outlined its proposal on avoiding deforestation (infra). On *adaptation*, several developing country Parties commented that it should have the same status as mitigation, but that this has not yet been the case. As a small island state, Tuvalu highlighted adaptation as a crucial topic and requested urgent action (as opposed to studies or pilot projects) to support the most vulnerable developing countries which are suffering damage. For AOSIS (the Alliance of Small Island States), the +2°C target promoted by the EU is unacceptably high for that matter. In connection with this, Kenya raised an interesting question about how much adaptation was already 'locked in' in this +2°C target, i.e. would this target not imply that at least for some countries (e.g. low-lying island states) their margin of adaptation would already be used up at that level, due to complete inundation? On *realising the full potential of technologies*, the Annex I Party obligation to come up with (funding for) the transfer of technology was called to mind once again. Brazil underscored the possibilities of biofuels with regard to climate change mitigation. Observing a lack of means and capacity, the country stated that a new paradigm was needed to make South-South cooperation work effectively. Canada urged for an improved deployment of existing technologies and a strong diffusion and demonstration of new technologies. The role of a healthy economic development to attract investments also came up for discussion. With regard to *realising the full potential of market based opportunities*, several Parties noted limits to what market mechanisms can do and also noted some flaws in the current use of the CDM (low content of technology transfer within CDM, only 2% of CDM projects are in Africa, cost-effective CDM projects do not always support sustainable development etc.). Uganda expressed worries that a market approach might enlarge the

existing differences between developing countries (Grobber, 2006). The EU, however, noted that the total value of the global carbon market in 2005 was many times larger than official funding for the Global Environment Facility. China stated that the CDM was a relatively sound mechanism that should continue to be operational after 2012.

Finally, Parties were invited to speak out on the organisation of future workshops. The responses were relatively unanimous: there was a need for more focused discussions (for example, by focusing on just a few key questions, possibly selected in advance by the co-facilitators). In particular, the enhancement of UNFCCC implementation was mentioned several times as an issue which needed to be brought into focus.

The outcome of the meeting, a report by the co-facilitators, will be used as an input at COP 12 and 13. The next workshop will be held in November 2006, in Nairobi.

1.3.3. Avoiding deforestation: The Papua New Guinea proposal

Following its presentation at the Seminar of Governmental Experts (SoGE, Bonn, May 2005) Papua New Guinea, with the support of a number of Latin American and African countries, requested the UNFCCC secretariat to include an agenda item at COP 11 entitled “Reducing emissions from deforestation in developing countries: approaches to stimulate action”. Shortly before COP 11, a joint document by Papua New Guinea and Costa Rica with the same title was submitted.²⁹

In this text, the two countries note that although an important share of global GHG emissions originates from (tropical) deforestation, the UNFCCC does not provide by itself a mandate or incentive for addressing (i.e. reducing) these kinds of emissions. Papua New Guinea and Costa Rica therefore stress the need for new approaches in this area, basically with the goal of accounting reduced deforestation rates as emission reductions. The text makes two suggestions for moving forward: either to create a new free-standing Protocol to the UNFCCC or to make forest conservation activities eligible under the CDM.³⁰

The issue was subsequently taken up by the COP 11 which invited Parties to submit to the UNFCCC secretariat, by the end of March 2006, their views on issues concerning reducing emissions from deforestation in developing countries, “focusing on relevant scientific, technical and methodological issues, and the exchange of relevant information and experiences, including policy approaches and positive incentives”.³¹ The COP also invited Parties to submit recommendations on any further process to consider these issues and requested the SBSTA to consider the information in the submissions, beginning at its twenty-fourth session (May 2006). The COP finally requested SBSTA to organize a workshop before SBSTA 25.

The secretariat received 18 submissions from Parties, which elaborate on numerous aspects of this issue.³² Deforestation is a hugely important topic within the context of climate change for several

²⁹ FCCC/CP/2005/Misc.1

³⁰ *Ibidem*.

³¹ FCCC/CP/2005/L.2

³² Available in one document at: <http://unfccc.int/resource/docs/2006/sbsta/eng/misc05.pdf>

reasons. While tropical deforestation is obviously not the main source of GHG emissions, it makes a considerable contribution to the global volume. Papua New Guinea's submission quotes IPCC figures estimating that land-use changes, dominated by tropical deforestation, released between 0.8 and 2.4 Gt of carbon per year during the 1990's, equivalent to 10% - 25% of global human induced emissions. Recent research estimates that the source of atmospheric carbon from tropical deforestation is $+1.6 \pm 0.6$ Gt/yr for the 1990s.³³ Austria's submission on behalf of the EU states that deforestation in developing countries constitutes about 20 % of global anthropogenic GHG emissions. Apart from these extra emissions, deforestation also represents additional threats to climate stability: it destroys ecosystems that are sequestering CO₂ and it changes historical land surface conditions that attenuate global climate and regional weather patterns.

The reasons behind deforestation in developing countries are plentiful, complex and differ both within and between countries and regions. Among the ones mentioned in the submissions are: poverty; the current system of perverse international market incentives for agriculture (cash crops), cattle ranching and timber production; illegal logging; forest fires; the creation of new settlements etc.

Some Parties highlight that decreasing deforestation rates would also have other positive effects such as maintaining biodiversity and protecting the surroundings of indigenous people. Policies to control emissions from deforestation, however, must consider local, regional, national and international perspectives and context. Employing a wide range of policy and incentive instruments is advisable.³⁴

Consideration of this topic in light of the submissions received was initiated at the SBSTA 24 (May 2006), which decided³⁵ to continue consideration at SBSTA 25, taking into account the results of the afore-mentioned workshop, which will be held in Rome (August-September 2006).

Accounting forest preservation measures as emission reductions is definitely not an easy task. Many issues remain to be resolved (definition of deforestation³⁶, data availability, establishing baselines, monitoring, uncertainties etc.) and discussions about this topic are ongoing.

1.4. Conclusions

The first chapter gives a comprehensive overview of some important evolutions in the debate on climate change, equity and sustainable development over the last decade. It paints a broader historic picture behind the concerns and interests of developing countries for the post 2012 period, that will be the subject of the rest of the research report.

The chapter first discusses the scientific debate on climate change and the way the framing of this debate is slowly evolving. In the late 1980s climate change was framed by natural scientists as a

³³ Cf. CO₂ emissions resulting from fossil fuel burning (plus a small contribution from cement production) are estimated to be approximately $+6.3 \pm 0.4$ Gt/yr during the period 1990-1999. Data from: Houghton (2005), "Aboveground biomass and the Global Carbon Balance", *Global Change Biology* 11, (2005), 9456-958, cited in: Achard et al., 2005.

³⁴ <http://unfccc.int/resource/docs/2006/sbsta/eng/misc05.pdf>

³⁵ FCCC/SBSTA/2006/L.8

³⁶ E.g. to what extent should temporary forest cover change (harvest activities) or illegal activities be taken into account?

problem of long-term disturbance of the global geo-biochemical cycles and the associated effects on global climatic patterns. Climate change was divorced from its social context and normative aspects were largely ignored. Policy options were primarily evaluated in terms of cost-effectiveness. In particular developing country scholars have been making the case for linking climate change to issues of equity and sustainable development. The substantive argument here is the intellectual recognition that sustainable development can be both a framework condition and a motor for the better implementation of climate policy. There is, however, an institutional argument as well, i.e. the growing awareness that the IPCC has lagged far behind the conditions and principles laid down by the UNFCCC and the importance accorded by the UNFCCC to sustainable development. A full integration of equity and sustainable development in climate change science will demand the involvement of new classes of analysts and new disciplinary perspectives from across social, legal and organisational sciences. A step in this evolution may be the Fourth Assessment Report of the IPCC, due for 2007.

The chapter further analyses the way equity and sustainable development have been integrated in the UNFCCC and the Kyoto Protocol, and presents the last evolution since COP11 and COP/MOP1 in Montreal, November-December 2005. Equity considerations and sustainable development are clearly part of the current regime. They are translated in principles such as the principle of common but differentiated responsibilities, in the differentiation of commitments between Annex I and non-Annex I countries, in articles on financial assistance and technology transfer, and in a certain degree of procedural equity. However, one can hardly claim that these issues have been in the centre of the political debate so far. This is partly because in recent years, a lot of attention and energy went to the ratification process by Annex I countries. This divergence of energy is sometimes interpreted as a marginalization of developing country concerns. Now that the protocol has finally entered into force in February 2005, Southern concerns may become more prominent, consistent with the long-term objectives of the UNFCCC (e.g. those related to sustainable development).

Furthermore, this renewed attention for developing countries' concerns and interests will be an absolute necessity because it is obvious that current Annex I countries cannot solve the problem of climate change by themselves alone. Some form of participation of (certain) developing countries will be needed in the future. Whether developing countries will be willing to participate in one form or another in a post-2012 regime, will depend on amongst other things whether the current commitments under the KP will be fulfilled, what the features of the post-2012 regime are and whether these will sufficiently take into account developing countries' concerns and interests.

Since the Montreal climate summit (COP 11 and COP/MOP1, November-December 2005), official talks on the future regime are being held along several negotiation tracks. For the moment, there are only two official tracks. The Kyoto track under Article 3.9 KP is meant to discuss new emission reduction commitments for Annex I countries. The Convention track, which is defined as a dialogue on long-term cooperative action to address climate change, cover a broader perspective in terms of contents (including adaptation, technologies and development goals) and participation (including developing countries and Parties under the UNFCCC which have not yet ratified the Kyoto Protocol). Negotiations under both tracks are currently focused on the organisation of the talks, and on gathering and exchanging information and point of views. A number of additional tracks might emerge in the

future based on Article 9 KP (review of the adequacy of the KP) and on two proposals by Papua New Guinea (avoiding deforestation) and by the Russian Federation (voluntary commitments for developing countries).

Chapter 2. An analysis of developing countries' concerns and interests

2.1. Approaches along several lines

As has been mentioned in the previous chapter, during COP11 and COP/MOP1 several decisions were taken to start the discussions on the post 2012 climate regime. The two most important ones are, under the Convention, the start of a dialogue on long-term cooperative action to address climate change (Convention Track), and under the Kyoto Protocol the start of an ad hoc working group on art. 3.9. of the Protocol (commitments of Annex I Parties; Kyoto Track). Furthermore, Parties were invited to submit their views on a Papua New Guinea Proposal to reduce emissions from deforestation in developing countries, and to submit their views on Article 9 of the Kyoto Protocol which calls for a general review of the adequacy of the Protocol (with the first review starting at COP/MOP2). While the discussions in May 2006 at SBSTA 24 on the Convention and the Kyoto track give a general idea of what concerns and interests of Parties are, for the research project a broader base of literature was used to feed the analysis.

In the literature, several approaches are followed to describe developing countries' concerns. Some of them characterize concerns and interests along a geographical line (e.g. North versus South, Asian concerns and priorities, African concerns), others follow a typological line, still others follow a thematic approach. The three most important themes which can be identified in the post 2012 literature are: integrating climate change mitigation with (sustainable) development, adaptation to imminent climate change, and the architecture of the climate regime. Table 2.1 gives a broad overview of possible approaches. The discussion in this chapter follows partly the classification of table 2.1. Paragraph 2.2 starts the discussion with a glance at the interests of developing countries as a group. Paragraph 2.3. takes a regional approach with a discussion of African perspectives, the poorest continent, and Asian perspectives, the fastest growing and most populated continent. Paragraph 2.4. turns to four major emitters (China, India, Brazil and South Africa), while paragraph 2.5 discusses the most vulnerable countries (LDCs and SIDS). The three thematic concerns are interwoven through the different paragraphs and are treated separately in chapters 3, 4 and 5.

Approach	Description	Examples*
Geographical: The South (versus the North)	The focus is on the interests of developing countries as a group and in general. Sometimes these are opposed to developed countries' interests.	Najam et al. (2003) Bhandari P. (2006)
Geographical by Regions: <ul style="list-style-type: none"> • Asia • Africa • Middle and South America 	The focus is on a specific geographical region. Descriptions can range widely from developmental concerns, over adaptation issues to	Jung, T.Y. et al. (2005) Davidson, O. et al. (2003) NEPAD (2003) Simms A. (2005) Simms A. (2006)

	concerns on the architecture of the post 2012 regime.	Wairoto J. (2005, 2006)
Geographical by country	The focus is on the concerns of a specific country.	UNFCCC (2005), SOGE Parties submissions for the AWG and the Dialogue (Bonn, May 2006) Country studies such as from the Development and Climate project (www.developmentfirst.org)
Typology of countries <ul style="list-style-type: none"> • Major emitters • LDC's • SIDS 	The focus is on groups of countries with similar characteristics. Descriptions can range widely but are often focused on the primary concerns of these countries. For LDC's and SIDS these are typically adaptation issues, for major emitters issues of integrating development and growth with reduced GHG emissions.	Chandler et al. (2002) Bradley, R. et al. (2005) Maritius Strategy (2005)
Thematic concerns: <ul style="list-style-type: none"> • Development • Adaptation • Post 2012 regime 	The focus is on an important theme in the climate debate. The most prominent themes identified, are: integrating development with climate change mitigation, adaptation, and the architecture of the post 2012 climate regime.	Chandler W. et al. (2002) Shukla, P.R. (2002) Halsnaes, K. et al. (2005)
* characterization of the examples is tentative; articles and reports can sometimes be classified under several approaches		

Table 2.1. Approaches to describe developing countries' concerns and interest in the climate regime post 2012

To frame the discussion, we return to Shukla's remark which we used in the introduction to this report, namely that the timing of the climate change issue is inconvenient and inopportune for developing countries. Inconvenient since it coincides with a moment when developing countries are set for rapid economic growth; inopportune since their low stature in global power relations makes it difficult to negotiate agreements in their favour (Shukla 2002). Table 2.2 illustrates briefly why the climate problem is "inconvenient" for developing countries and what are going to be some of the structuring elements of the discussion with developing countries for the post 2012 climate regime.

First, in virtually all discussions on post 2012 and developing countries, the recurrent underlying theme is similar: how can development goals in the South be reconciled with climate change policies (mitigation, adaptation) and the climate regime? Or formulated somewhat differently: post 2012 climate change policies and the international climate regime should be formulated such that they contribute to development goals. Climate change per se is in general a low national priority issue in most developing countries compared to economic and social development policies such as poverty alleviation, industrialisation, food security, rural development, international trade, energy security etcetera. The reason is clear from table 2.2: even when income per capita is taken as the only indicator for development, the huge gap in welfare between Annex I and non-Annex I becomes very

visible. Since policy makers in developing countries are not willing to sacrifice economic growth and development, this strongly suggests that progress in GHG mitigation and adaptation will only occur if pursued from the perspective of development goals rather than for pure environmental/climate concerns.

Second, this low level of development is also reflected in low per capita GHG emissions in most developing countries. The strong relationship between low income per capita and low emissions per capita is largely due to lower rates of consumption and less energy-intensive lifestyles. Whatever form development will take, this will unavoidably imply higher consumption levels and more energy-intensive lifestyles in developing countries. Even with the use of more climate friendly technology, this will almost certainly lead to higher per capita GHG emissions. A lot of policy makers, scientists and ngo's in developing countries regularly state that they have a right to these higher GHG emissions per capita in order to satisfy their societies' demands for better living conditions.

However, third, due to several factors – such as population numbers, energy endowments, production and end-use energy efficiency – per capita emissions contrast with total GHG emissions. Already now, non-Annex I countries are responsible for almost half of total GHG emissions worldwide, and since decomposition analysis shows that GDP and population are the main determinants of emissions trends (Baumert et al. 2005), this share is expected to grow. This has been and still is a main concern of policy makers in developed countries, not only for environmental reasons but, due to the characteristics of the UNFCCC and Kyoto Protocol which relieve developing countries from mitigation commitments, also for economic reasons.

Finally, current total GHG emissions contrast sharply with historical emissions. Although historic contributions to climate change can be assessed in different ways – based on cumulative CO₂ emissions³⁷, on contribution to atmospheric CO₂ concentrations or on contribution to the increase in global average temperature – the relative results these alternative methodologies yield are quite similar for most countries (ibid.): developed countries have contributed around 75% to the climate problem, while developing countries only contribute around 25%. The historical responsibility for climate change has been hinted at regularly by developing country representatives, implying that it should at least partially determine GHG emission targets. The best known proposal in this respect was made by Brazil in the run-up to the Kyoto conference.

Of course, these four factors are far from being the only ones to shape the climate discussion post 2012, but they rank high as explicit or implicit underlying argumentation on the role of developing countries, amongst others in relation to the who and what in mitigation, support for adaptation, and responsibility for funding and technology transfer. They will also return in a lot of the analysis and discussion in the rest of this chapter.

³⁷ Data for non-CO₂ gases and LUCF prior to 1990 are virtually absent.

Country	% Total World CO ₂ e emissions, 2000	% of World Cumulative CO ₂ emissions, 1850-2002	% World Population 2002	CO ₂ e per cap., 2000	Income per capita, 2002 \$PPP
USA	20,6	29,3	4,7	24,5	34.557
China	14,7	7,6	20,7	3,9	4.379
EU-25	14,0	26,5	7,3	10,5	22.917
Russia	5,7	8,1	2,3	13,2	7.993
India	5,6	2,2	16,9	1,9	2.572
Japan	3,9	4,1	2,1	10,4	25.788
Germany	3,0	7,3	1,3	12,3	26.141
Brazil	2,5	0,8	2,8	5,0	7.480
Canada	2,0	2,1		22,1	28.728
UK	1,9	6,3	1,0	11,1	25.139
Annex I	52	76		14,1	22.254
Non-Annex I	48	24		3,3	3.806
World	100	100		5,6	6.980

Table 2.2. Top 10 emitters, Annex I and non-Annex I: % of total world CO₂e emissions, % of world cumulative CO₂ emissions 1850-2002, % of world population, CO₂e per capita in tons, income per capita in terms of purchasing power parity (constant 2000 international dollars). Emissions from international bunker fuels and land use change and forestry are excluded. Source: Baumert et al. 2005.

2.2. Taking the global perspective: concerns and interests of the South

The point of departure for virtually all developing country authors and policy makers is that development will remain the primary preoccupation of developing countries in the next decades. Therefore, it is development policies – or sustainable development policies – that will provide the context within which climate policies have to be implemented. Both goals should reinforce each other: combating climate change is vital to the pursuit of sustainable development; equally, the pursuit of sustainable development is integral to lasting climate change mitigation (Najam et al. 2003). In what is often called a ‘development first’ approach, the only politically viable option to climate mitigation in developing countries is to devise development strategies that can produce climate benefits ancillary to sustained economic expansion. Mitigation for developing countries should consequently not be interpreted as absolute reductions in GHG emissions, often expressed by developing countries as “no new commitments for non-Annex I countries”, because GHG emissions from developing countries will

need continue to grow in order to meet basic human needs. However, when the objective is to “prevent dangerous anthropogenic interference with the climate system” (article 2 UNFCCC), deep emission cuts from industrialised countries will have to be accompanied by substantial deviation from business-as-usual trends in most advanced developing countries. While this does not yet enter official statements from developing country representatives at UNFCCC forums, the potential of voluntary sustainable development policies and measures to reduce the growth in emissions has been mentioned (e.g. by South Africa during the dialogue on the Convention Track, Bonn, May 2006). Furthermore, this relative decoupling of emissions and economic growth has been explicitly mentioned by different Southern authors and research institutes as a chance for developing country participation in climate mitigation, albeit only on the basis of a clear translation of the principle of common but differentiated responsibilities. Different criteria – such as historical responsibility, financial capability and potential to mitigate – could then be used to differentiate between developing countries and involve them in a staged manner (see e.g. Ott et al 2004; see also chapter 5).

The second concern of developing countries is related to the fact that some form of climate change is unavoidable and that impacts will be felt first and most by the most vulnerable communities and countries, which are also the poorest and least able to adapt to climate change. A lot of countries in the South have fragile ecosystems, while simultaneously large portions of their population and economies are dependent on ecosystems (agriculture, fisheries, forestry...). The fear is that economic development which may be achieved in the next decades, can be swept away, in particular in LDC's and SIDS. Even in countries where this is well-known, it is usually not taken into account in policy-making and development plans. While it should be a priority for climatically vulnerable and economically impoverished countries in the South to strengthen their social, economic and technical resilience (or ‘adaptive capacity’), major obstacles have been identified for formulating and implementing such adaptation measures, including the lack of policy-relevant scientific information at the domestic level and shortage of funding for adaptation at the international level (Jung et al., 2005). Furthermore, although adaptation is an important item in the UNFCCC and the Kyoto Protocol, it has long been side-stepped in negotiations because most political attention was focused on getting Annex I countries to ratify the Protocol. It lasted till COP 10 in Buenos Aires before a decision was taken to develop a five-year work programme on adaptation. There have also been considerable disagreements over the financial mechanisms created for supporting adaptation and the lack of funding of these mechanisms.

The third concern is related to the architecture of the climate regime and in particular to the way it has taken shape in the Kyoto Protocol. A lot of Southern policy makers and observers feel that previous discussions on the climate regime were conducted in a non-transparent manner and did not adequately consider their interests and needs. The Kyoto regime and the burden sharing amongst Annex I Parties is based on “stated willingness and political expediency” (Najam et al. 2003, p. 224) instead of on equity and responsibility between and within generations. The fact that the Kyoto regime and the burden sharing amongst Annex I Parties is not based on a clear and predictable formula or basis for emissions reductions may not only set a bad precedent for the future but also leaves the developing countries without any clue about the basis on which they will be required to enter the

regime at some future, unspecified date (ibid.). In terms of developing country interests, a post 2012 regime should then be based on UNFCCC basics, i.e. targets in terms of long-term atmospheric stabilisation, based on clear and objective principles and perceived as fair and equitable by all countries.

These three concerns – the architecture of the climate regime, adaptation to imminent climate change and integrating climate change and (sustainable) development – return again and again under different variations and with different accents in literature, reports and statements. Bhandari (2006) captures them in a few sentences when she states that “any future climate regime will be contingent on the play off between EU and developing countries, and will heavily depend on the EU leadership. A reaffirmation to the development cause will dispel the notions that any commitment to mitigate emissions will necessarily come at the cost of development (...) Further, adequate and timely emphasis on adaptation will display the willingness to deal with the clear and present danger that may unfold” (ibid, 8).

2.3. Interests and concerns of regions

While the previous paragraph dealt with literature that tries to formulate concerns and interests of ‘the South in general’ in the climate debate, this paragraph focuses on the problem from the point of view of regions. We look at African perspectives, the poorest continent, and at Asian perspectives, the fastest growing and most populated continent.

2.3.1. Africa

2.3.1.1. Adaptation and development

An interesting document to start from for Africa is NEPAD, the New Partnership for Africa’s Development, which was published in 2001 and forms the result of discussions between the African heads of state and government. NEPAD is defined as a vision and a strategic framework for Africa’s renewal. It was developed within the Organisation of African Unity (OAU) and formally adopted at the 37th Summit of the OAU in July 2001. NEPAD served also as African input for the World Summit on Sustainable Development (WSSD, Johannesburg 2002). Chapter VIII of the plan of Implementation of the WSSD explicitly refers to NEPAD as “a framework for sustainable development on the continent to be shared by all Africa’s people. The international community welcomes NEPAD and pledges its support to the implementation of this vision” (UN 2002, para 62) The Johannesburg Plan of Implementation contains 47 recommendations aimed at ensuring the promotion of sustainable development in Africa within the framework of NEPAD.

NEPAD identifies the following priorities for Africa in the next decade:

- the eradication of poverty
- a path of sustainable growth and development
- a beneficial integration into the global economy
- and the acceleration of the empowerment of women.

The priority sectors which have to be addressed to realise these goals are:

- Agriculture
- human development (health, education, science and technology)
- building and improving infrastructure (energy, transport, water, sanitation, ICT)
- diversification of production and export
- accelerating intra-African trade and access to markets of developed countries
- environment

In October 2003 an *Action Plan of the Environment Initiative* was published under NEPAD. The underlying logic is “NEPAD’s emphasis on measures that will ensure that the continent is able to confront its short-term economic growth challenges without losing sight of the long-term environmental, poverty eradication and social development imperatives” (NEPAD 2003, 12). In the analysis of the Action Plan, Africa is characterized by two interrelated features: rising poverty levels and deepening environmental degradation. The Action Plan advises an integrated approach where economic growth, income distribution, poverty eradication, social equity and better governance are seen as an integral part of Africa’s environmental sustainability agenda. The Action Plan identifies 6 Programme Areas for policy and project development: 1. Combating land degradation, drought and desertification; 2. Conserving Africa’s Wetlands; 3. Prevention, control and management of invasive alien species; 4. Conservation and sustainable use of marine, coastal and freshwater resources; 5. Combating climate change in Africa; 6. Transboundary conservation or management of natural resources. Besides these programme areas, the Action Plan also identifies several cross-cutting themes which influence and are influenced by the programme areas: health and environment, transfer of environmentally sound technologies, assessment of and early warning on natural disasters.

A closer look at programme area 5 in the Action Plan, *Combating Climate Change in Africa*, teaches that its focus is almost exclusively on vulnerability assessments and development of adaptation strategies. The Plan observes that “although Africa has not historically contributed to climate change and its forests have played the role of significant sink for the carbon emitted by industrialized countries, it is predicted that the continent will be the most affected by the adverse effects of climate change, as many aspects of African economies are still sensitive to climatic hazards” (ibid., p. 63). The most important areas of concern are:

- (a) water resources, particularly in international shared basins where there is a potential for conflict and a need for regional coordination of water management
- (b) food security at risk of a decline in agricultural production and uncertain climate
- (c) productivity of natural resources at risk and biodiversity that might be irreversibly lost

- (d) vector- and water-borne diseases, in particular in areas with inadequate health infrastructure
- (e) coastal zones vulnerable to sea-level rise, particularly roads, bridges, buildings and other infrastructure that is exposed to flooding and extreme weather events
- (f) exacerbation of desertification by changes in rainfall and intensified land use

This identification of vulnerable sectors for Africa in general is not matched by vulnerability assessments and development of adaptation strategies for specific ecosystems, regions, sectors or communities. Although the situation has improved somewhat with the adoption of NAPA's in several African countries (see also chapter 4 on adaptation), the observation of the Plan still holds true that most countries have examined only biophysical impacts of climate change – in most instances qualitatively – but that very few socio-economic impacts have been analyzed and costed. The Action Plan advises the integration of climate concerns and NAPA's into national development planning, “particularly through the involvement of the economic, financial and planning agencies of Government, working in conjunction with the international donor community and private sector investors” (ibid., 67). Waioto (2005, 2006) voices the same kind of concerns when he stresses the huge need for adaptation and reduction of vulnerability in Africa. Consequences of climate change will be enormous through e.g. extreme climate events, crop failure and live stock loss due to drought, decreases in hydro-power generation with decreasing water levels, vector-borne diseases, damage to infrastructures due to floods. In this way, climate change will interrupt national development plans and subvert economic policy. Development aspirations, NEPAD objectives and MDG's will be compromised and unmet.

The ngo report *Africa – Up in smoke?* (Simms and Reid, 2005) stresses that the exceptional vulnerability of Africa to climate change is in large part due to the fact that small-scale farming, dependent on direct rainfall, provides most of the food produced in Africa, as well as employment for 70 per cent of working people. “Africa's social and economic development is now even more in danger because climate change threatens to undermine the integrity of the continent's rich but fragile ecosystems” (ibid., p. 6). Areas of concern identified by the report include food and farming; energy (see following paragraph 2.3.2.1. for these two concerns); water, drought and changing rains; health impacts; disasters; gender; migration; conflict; the orientation of official development policy.

Interestingly, Waioto (2006) as well as Simms and Reid (2005) stress the importance of learning from traditional adaptation strategies. Since African people have always had to cope with climate variability, these strategies could serve as a basis for adaptation strategies to change. Waioto states that indigenous knowledge and traditions should form the basis of the adaptation strategy, but new policies and resources are needed to adapt existing strategies to changing circumstances. Technology transfer from developed countries is a necessary addition to existing knowledge and technology. Waioto refers to local adaptation strategies such as leaving farmlands furrow, rearing sheep or goats, cultivating varieties of traditional drought resistant subsistence crops (e.g. sweet potatoes, yams, cassava, millet), using animal and compost manure in farming practices, traditional indices for monitoring weather and climate, traditional knowledge on medicinal herbs and tubers. Under pressure of 'development' practices such as cultivating cash crops, genetically modified crops or using fertilisers

and chemicals, these traditional strategies have become more and more obsolete. Simms and Reid stress that although the role of new technology such as improved weather forecasting has gained a lot of attention, development groups see a more urgent challenge in strengthening communities from the bottom-up, and building on their own coping strategies to live with global warming (Simms and Reid 2005, p. 2).

2.3.1.2. Energy, agriculture and development

While a lot of literature on climate and Africa focuses on adaptation, less attention is paid to integrating current and future African development strategies that aim at economic growth and social benefits with climate concerns. Davidson et al (2003) address this problem explicitly when they formulate the need of a 'development first approach' for Africa: shaping development in such a way that countries can realise their development goals in a sustainable way (i.e. following a low emission pathway, wise use of natural resources) and at the same time reduce vulnerability to climate change. In the analysis of Davidson et al the most pertinent question for Africa is: what should be done, and how, to transform the daily lives of the poor majority and to improve both the standard of living and the environment of the poorest? Two sectors which should get top priority in answering this question are the energy sector and the agricultural sector. They both offer huge possibilities for synergies between development policies and the two main climate concerns, i.e. reducing the vulnerability of society and developing towards a low emission economy.

Turning to the energy sector, Davidson et al remark that energy is a major problem for Africa "more so than anywhere else in the world. In the decades to come, Africa will have to consume far more energy if it is to climb out of its underdevelopment and satisfy its societies' demands for better living conditions" (ibid., S106). Nine out of ten persons in Africa have no access to electricity and three quarters of their energy comes from traditional fuels. With 14 percent of the world's population, Africa emits only about 3,5 per cent of greenhouse gases (NEPAD 2003). Still, everybody agrees that the continent is rich in energy resources, such as biomass, geothermal and hydropower, with a huge potential for solar energy. "The continent has abundant natural resources, but these are often either under-used, badly exploited or exported to richer countries" (Simms and Reid 2005, 20).

It is remarkable that the NEPAD *Action Plan of the Environment Initiative* dedicates only a few paragraphs to mitigation of emissions. The Action Plan essentially refers to the NEPAD Energy Initiative (NEPAD 2002) where a goal has been identified of increasing access to sustainable, reliable and affordable commercial energy supply from 10 to 35 per cent or more of the population in the next 20 years. The general idea is to optimize social and economic benefits while minimizing environmental impacts. The projects in Table 2.3. have been identified to support energy development in the short term and to contribute to medium- and long-term development goals. The stress is on development of oil and gas exploitation, large hydropower and grid development for electricity distribution. The Action Plan of the Environment Initiative advises to further explore in this regard the role of hydropower, other forms of renewable energy and small-scale projects designed to meet rural electrification needs, as well as the possible link with the Clean Development Mechanism.

Power system projects Mapanda Uncua Hydropower Ethiopia-Sudan Interconnection West Africa Power Pool (WAPP) Program Algeria-Morocco-Spain Interconnection (strengthening) Algeria-Spain Interconnection & Algeria Gas-fired Power Station Mozambique-Malawi Interconnection
Gas/Oil Transmissions projects Kenya-Uganda Oil Pipeline West-Africa Gas Pipeline (WAGP) Lybia-Tunesia Gas Pipeline
Studies Grand Inga Integrator DRC-Angola-Namibia Interconnection Nigeria-Algeria Gas Pipeline Sub-Regional Interconnections (East, West, Central)
Capacity building (regional) AFREC Operationalisation & REC Capacity Building Africa Energy Information Systems & Planning Tools Training of Energy Experts
Facilitation (regional) Policies and Strategies Energy Protocol Cooperation in new and renewable energy Cooperation in improving energy efficiency and reliability of supply Cooperation in oil and gas trade, refining/processing Cooperation in rural energy

Table 2.3. Summary of Energy Sector Projects and Initiatives for the short term (NEPAD 2002)

A much more critical approach to the energy and development problem is taken in Simms and Reid (2005) and in Davidson et al (2003). They state that energy strategies which are economically effective, environmentally viable, socially equitable and contribute to reduction in energy poverty should probably focus most on the local level. Small-scale off grid application of renewable energy and electricity can supply power to areas currently without electricity – 95% of rural Africa. Examples include small-scale solar PV systems, small scale hydropower plants, small scale wind turbines, biomass generators, solar thermal water heaters and so on. “The scale of these examples needs to be expanded if larger economies of scale are to be produced” (Davidson et al 2003, S107). In contrast, “mega hydro- and gas-power schemes, together with grid expansion, puts all the energy eggs in one basket, soaking up the available aid and investment, leaving little to deliver access to energy services for the poorest. Large power projects also tend to rely on international technologies, consultants and contractors, meaning that the funds invested will leak out of Africa and very little capacity building will take place where the projects are built” (Simms and Reid 2005, 23). While current exploitation of fossil fuels in Africa does little for development or security of its people, Africa could leapfrog ‘dirty development’ when international donors and financial institutions switch investment from fossil fuels to promoting access to renewable and sustainable energy (ibid., 4).

Turning from energy to the agricultural sector, Davidson et al state that the most pressing need here is to halt the decline in agricultural yields and to increase food security by producing more food and taking measures to deal with irregular rainfall. Territorial expansion of the area for agriculture – with tree clearing as a primary cause of deforestation and soil erosion – is currently the main strategy

to increase agricultural production and meeting food needs. The analysis goes along the same lines as the one of Wairoto cited above that under pressure of 'development' practices such as cultivating cash crops, genetically modified crops or using fertilisers and chemicals, traditional strategies have become obsolete. The sector is at high risk because of desertification/deforestation for agricultural territorial expansion on the one hand and more competitive international producers on the other hand. Also Simms and Reid plead for renewed and massive investments in small-scale agriculture, concentrating on diverse cropping systems instead of mono-cropping, because these are not dependent on expensive and energy-intensive artificial inputs and because they are much more suited to harsh African conditions.

2.3.1.3. UNFCCC, Kyoto and post 2012

Wairoto formulates some African concerns and demands on the level of international negotiations. In his analysis, the central issue is equity. Kyoto lacks equity and favours polluters more than non-polluters. For the post 2012 negotiations, Africa should return to the kind of proposals it made for the 1997 Kyoto negotiations. The 'contraction and convergence' proposal is closest to this position (Wairoto 2006). It is based on global emission allocations based on pc basis (every human being is born equal), a globally agreed date for contraction and convergence and trading of emissions based on entitlements (see chapter 8 for a discussion). Further, Africa needs a form of compensation for the changes it will be subject to but for which it is not responsible. "It is time now for Africa to be wary of inequitable proposals couched with adaptation in order to entice (...) Africa needs to negotiate for policies which allow her freedom to trade her unused emissions entitlements and invest the proceeds in her development goals according to her priorities (...) Arrangements which treat Africa, with her unused environmental space, as pariah, must be rejected outright" (ibid., p. 14).

Davidson et al state that a 'development first' approach opens up a prospect for a constructive role of Africa and developing countries in general in addressing climate change and working towards new international agreements. But international policies should provide incentives for countries to move in this direction. First, within the UNFCCC framework new avenues could be opened up to stimulate land-use policies, technology development and transfer, sector-transition strategies. Further development of CDM or proposals such as the sustainable development policies and measures approach (SD-PAMs, see chapter 5) could tailor the climate regime to development needs. Second, improving coherence and striving for synergies between different international fora and processes will be necessary, not only between different multilateral environmental agreements, but also for example between the Rio agreements and the World Trade Organisation. Third, stimulation of regional co-operation and the re-orientation of FDI in a climate-friendly direction could form part of a future development and climate regime.

2.3.2. Asia

Starting in early 2005 and continuing in 2006, the Institute for Global Environmental Studies (IGES), has set up a consultation process to stimulate thinking about the climate problem and post 2012 period in Asia and to increase Asian influence on the climate negotiations. IGES is a Japanese research institute, established by an initiative of the Japanese Government in 1998, with the aim of conducting strategic policy research to support sustainable development in the Asia-Pacific region. The report *Asian Perspectives on Climate Regime beyond 2012. Concerns, Interests and Priorities* is the product of the 2005 part of the consultation, with meetings being held in China, India, Indonesia, Japan, Republic of Korea, Viet Nam and a regional dialogue for other Asia-Pacific countries. The report serves as main input for this paragraph.

2.3.2.1. Integrating mitigation and adaptation in development

An important rationale behind the consultations was that in particular stakeholders from the developing countries in the region have the opinion “that previous discussions on the climate regime were conducted in a non-transparent manner and did not adequately consider Asian interests, concerns, priorities and development needs (...) especially in view of the region’s growing influence on energy demands and GHG emissions due to rapid economic and population growth” (Jung et al 2005, vii). Furthermore, the region is home to large and poor populations with low adaptive capacity.

The top priority identified in the dialogues is ensuring that climate change policies contribute to development goals in Asia. Currently, climate change per se is a low national priority issue compared to economic and social development policies. A limited survey during the consultations taught that the following issues were considered as development priorities: energy security, poverty alleviation, industrialisation, food security, international trade, rural development, deforestation/desertification, biodiversity³⁸. Due to this prioritisation, it seems clear that progress in GHG mitigation and adaptation will only occur if pursued from the perspective of development goals rather than pure environmental concerns. Although the terminology is not explicitly used, this resembles in fact very much the approach of ‘development first’ and ‘SD-PAMs’.

Of particular importance in this context is the outlook of energy demand and GHG emissions in Asia. Energy demand in Asia is escalating due to rising population, rapid economic growth and social transformations characterised by urbanisation and industrialisation (ibid., 6). The Asia-Pacific region is of course very diverse, with 13 LDC countries, several small island states, 2 OECD members (Republic of Korea, Japan), OPEC members, the most populous countries (China and India), and one Annex I country, Japan. In particular for developing Asia, per capita GHG emissions (1-2 tons) are much lower than the world average and 10 to 20 times less than those of the industrialised countries, but total emissions from Asia are increasing fast and currently account for 20% of world total. This

³⁸ The authors note that survey participants share a similar background in terms of awareness on economic and environmental issues and that – even while a well-balanced representation was sought from stakeholders with different backgrounds – the survey’s sample size is limited and did not follow the formal procedure of sampling (Jung et al 2005, 71).

contrast between total and per capita emissions is most striking for China and India (see also table 2.2). China and India have coal-based energy structures and will continue to rely on coal in their energy mix over the next decades. This use of traditional fossil fuels such as coal is widespread in the rest of Asia as well. Consequently, one of the priorities in linking development to climate issues will be how to meet energy needs and energy security while still following a low carbon emission path. Due to the importance of coal, technology development and transfer in the field of e.g. clean coal technologies, energy efficiency and carbon capture and storage are deemed necessary.

Concerning topics of adaptation, a lot of countries in the Asia-Pacific region have fragile ecosystems, while simultaneously large portions of their population and economies are dependent on ecosystems (agriculture, fisheries, forestry...). According to IPCC reports the highest vulnerabilities in the sectors of food and fiber, water resources, coastal ecosystems and settlements. Other vulnerable sectors are biodiversity and human health. While this is relatively well-known in the region, it is not taken into account in policy-making. "In India, for example, it was pointed out that none of the on-going water resources planning for the next fifty years has seriously considered the impacts of climate change. The Chinese government, too, has not paid full attention to the impacts of climate change when designing its national development plans, including reservoir construction plans" (ibid., p. 79). Major obstacles for formulating and implementing adaptation measures, as noted by participants to the consultations, include the lack of policy-relevant scientific information at the domestic level and shortage of funding for adaptation at the international level.

2.3.2.2. Concerns for the post 2012 regime

The IGES report pays a lot of attention to critical features of a post 2012 regime, the rationale being that it is necessary to identify ways to build a more equitable and effective climate regime from an Asian perspective. Apart from the topics already discussed in the previous paragraphs – linking climate and development priorities, need of adaptation strategies – the following issues are identified:

- the importance of leadership by developed countries, demonstrating that economic and social development can be climate-friendly. The unsustainable lifestyles of developed countries remain a major barrier, while many policy-makers believe that several developing countries in Asia have traditionally adopted climate-friendly lifestyles.
- Developing country participation: GHG emissions from the region will continue to grow in order to meet basic human needs, but reducing the growth in emissions and diverging from a business-as-usual path is recognised as an option, albeit on the basis of a clear translation of the principle of common but differentiated responsibilities. Discussions could explore ways to involve various countries in a staged manner based on a set of criteria such as historical responsibility, per capita emission rights, development needs etcetera.
- Market mechanisms can be a powerful tool for bringing down the growth in GHG emissions, but cannot solve all development problems. An option here is strengthening the CDM in order to make it a primary driver in the international carbon market, but this will require several reforms of the CDM. Reforms deemed necessary include amongst others institutional reforms (Executive Board,

standardisation of methodologies, simplification of approval process), reduction in transaction costs and widening the scope of CDM (sector- or policy-CDM, eligibility of avoidance of deforestation). In this process the environmental integrity of CDM should not be sacrificed.

- Technology development and diffusion: transfer and dissemination of technologies are judged as far from satisfactory, due to barriers at every state of the technology process. A future regime must facilitate a right mix of technology push (through public R&D investments) and market pull (through provision of incentives for private sector innovation and technology deployment), while simultaneously identifying “tipping points” where small interventions of infusion of resources into technology intervention can reap large gains.
- Financing: the current climate regime, with its limited funds, is evaluated as being unable to make a significant difference in limiting GHG emissions in developing countries. Options for innovative financing and climate greening of FDI and ODA flows must be further researched
- Capacity building: there is significant concern that the region lacks institutional and human capacities to address climate change at various levels, one of them being the capacity to negotiate a future regime. In this last area concerns are raised concerning the availability of policy-relevant research to support positions, the number of delegates and the involvement of Asian ngo’s. Even large countries such as China and India were highly concerned on the capability of their negotiators to influence decisions.

2.4. Points of view of some major emitters

While the current climate regime divides countries in an Annex I and a non-Annex I group, it will probably be necessary to develop a more differentiated approach for post 2012 if the target of preventing dangerous climate change is to be reached, with some developing countries taking on quantitative or qualitative commitments. A group of countries which has been discussed for some time in this respect, is the group of so-called major emitters. This term refers to the volume of total emissions of some countries. Within the top 10 of major emitters, three developing countries can be found: China, India, Brazil (see also table 2.2). Within the top 25 – representing 83% of world emissions – the other developing countries are South Korea, Mexico, Indonesia, Iran, South Africa, Turkey, Saudi Arabia, Argentina and Pakistan (Baumert et al., 2005). This is clearly a very diverse group, and for a post 2012 regime it is undesirable and politically unfeasible to treat all these countries on the same level, only because they are ‘major emitters’. A more in-depth analysis of the situation of different countries will be necessary if they are to be included in a post 2012 climate regime with some form of commitment. It should be clear however that for the moment all these countries have explicitly stated that they will not take on *binding* commitments, but some seem willing to participate in voluntary, non-binding approaches. In this part of the chapter we look at the 3 top emitters in the South and the top emitter on the African continent. The descriptions give concise information on the concerns in the fields of mitigation and development, adaptation, and the post 2012 regime architecture.

2.4.1. China

Discussions of the role of China in the climate change problem and in climate change policies always reach similar conclusions: China already is the second highest consumer of energy and the second largest emitter of greenhouse gases, following the USA, but due to rapid industrialisation with economic growth, increasing urbanization and population growth the demand for energy and the emissions of greenhouse gases will unavoidably increase further. The engagement of China in mitigating climate change and in climate politics can thus be of huge importance. During the Seminar of Governmental Experts in May 2005 in Bonn (UNFCCC 2005), the Chinese government expressed different concerns. Not unsurprisingly, they can be categorized under “the effectiveness of the current regime and future action”, “adaptation to climate change” and “linking development and climate politics”.

The statement was almost exclusively dedicated to this last topic. The Chinese government seems to be aware of the challenge it is facing. “There is no precedent in the world yet that a country with high GDP per capita can maintain low energy consumption per capita. China is facing the challenge of creating a new sustainable way of production and consumption” (ibid., 12). As said above, the main driving forces for emission growth in China are economic growth and population growth. As the structure of the economy changes, urbanization leads to more energy being used in buildings and transportation. The socioeconomic priorities of the Chinese government are economic growth and poverty alleviation, but the high growth figures have led to energy security becoming one of the top national priorities. A clear witness to this is that it is predicted that over 60% of China’s energy needs will have to be met by imports by 2020 (Jung et al. 12). Now already, China imports about one-third of the oil it consumes, after being a net exporter only a decade ago. The fast growth in the transport sector is one of the drivers here. Furthermore, coal use accounts for 67% of total energy use, which when burned releases nearly twice as much carbon dioxide per unit of energy as natural gas. The Chinese government representative at SoGE stated that due to constraints in the availability of resources and market scale, China will have to use a large amount of coals for energy supply for a long time, which will keep the carbon intensity of China’s economy relatively high.

Nevertheless, China has been making continuing and increasing efforts to diversify its energy resources and increase energy efficiency. The reasons are economic and social (energy security, pollution control) and are not primarily related to wanting to comply with global climate change policy, although they are consistent with it (Pan 2005). According to a Pew Center report, “the resulting energy-intensity reduction remains unmatched in the history of economic development” (Chandler et al. 2002, 13). While most developing countries at China’s level of economic development have either steady or rising levels of energy intensity, China’s energy intensity declined approximately 60% between 1977 and 1997, an average of 4% a year (ibid., 15). Currently, China has several plans and laws in place to further increase energy efficiency and conservation, diversify energy production (increase of share of natural gas, nuclear, renewables such as hydropower, solar, wind and biomass) and improve its energy infrastructure. The government estimates that investments in the energy sector will amount to at least 1200 billion USD in the next 20 to 30 years (UNFCCC 2005, 12). The fear of

being locked in old fossil fuel technology for this enormous amount of investment in energy infrastructure explains the stress China puts on technology transfer in international negotiations. Technologies which China is interested in include clean coal technologies, energy efficiency, renewable energy (see also table 2.5).

Population (2004)	1.297 million
Annual Population growth (2004)	0,63%
Income per capita (2002 \$ GDP-PPP)	4.376 \$
Annual GDP growth (2004)	9,50%
GHG emissions (2000)	4.938 million MtCO ₂ e
GHG emissions per capita (2000)	3,9 MtCO ₂ e
CO ₂ emission growth 1990-2002 In MtCO ₂ In % change (CO ₂ figures exclude land use change and forestry)	1.247 MtCO ₂ 49%
GHG intensity level and trend Tons of CO ₂ e / \$mil. GDP-PPP (2000) Intensity (CO ₂ only) % change 1990-2002 GDP % change 1990-2002	1.023 -51% 205%

Table 2.4. Key statistics for China. Source: Jung et al.(2005), Baumert et al. (2005)

Concerning the second point of concern, adaptation to climate change, it is clear that its large territory and various climatic patterns make China vulnerable to negative impacts of climate change. The 1990s were amongst the warmest years of the 20th century in China. Global warming has contributed to decline in the run-off of the major rivers during the past 40 years, continuing drought in north China since the 1980s, frequent flooding disasters in Southern China since the 1990s, shrinking of glaciers by 21% in west China and a current rate of sea-level rise of 1,4-2,6 mm per year (Jung 2005). Continued warming trends will pose serious challenges because China is already vulnerable now, with per capita water resources about one fourth the world average, per capita arable land one third the world average, and an urbanization level beyond 36% in 2000, with the largest cities concentrated near the country's coastal areas (Papineau 2005). Vulnerability studies focusing on four areas (water resources, agriculture, terrestrial ecosystems, coastal zones) show that China lacks adaptive capacity in terms of human and technical capacity and financial resources.

On the third point, the current climate regime and its future, China has never denied the threat of climate change and has treated climate negotiations as an integral part of its foreign policy, where developing countries have to protect their development rights (Pan 2005). China has always adhered to the principle of common but differentiated possibilities and has repeatedly pointed out the historical responsibility of developed countries for the climate problem. Developed countries have to take the lead in reducing emissions and should help developing countries by technology transfer and funding. During the Kyoto negotiations, China officially stated that it would not consider limiting emissions until it reached a medium level of development (meant was an annual income of US\$5000 per person, to be reached around the middle of the 21st century) (ibid.). During SoGE, the Chinese government expressed its concern that the overall trend of increase in GHG emissions in developed countries is not effectively curbed. More effective measures will have to be adopted to lower per capita emissions

and fulfil the commitments under the Kyoto Protocol. "Compliance with the Protocol by developed countries will have great influence on the future of climate change actions" (UNFCCC 2005, 11).

Although it is unlikely that China will be willing to make legally-binding commitments to limit its emissions post 2012, the Chinese government has send several signals that it is willing to cooperate in forging a post 2012 climate regime and that it may be flexible in participating in the mechanisms and features of this regime. The expression "medium level development" has not been used again and the country wishes to cultivate the image of a large and responsible country (Pan 2005). In particular, China is interested in a new mechanism for technology transfer to further rapid dissemination of new energy technology. Its policy-makers think that technology transfer from Annex I countries will have to increase exponentially if China is to substantially reduce GHG emissions without compromising its development goals (Jung 2005). Testimony to its interest in actively promoting international technological cooperation is the Chinese participation in at least four bi- or multilateral partnerships: the Asia-Pacific Partnership for Clean Development and Climate, the EU and China Partnership on Climate Change, the Australia-China Climate Change Partnership, the US-China Working Group on Climate Change.

<i>China's international technological cooperation in different partnerships.</i>	
The Asia-Pacific Partnership for Clean Development and Climate	
<ul style="list-style-type: none"> • <i>Objectives:</i> create a new partnership to develop, deploy and transfer cleaner, more efficient technologies and to meet national pollution reduction, energy security and climate concerns • <i>Areas:</i> energy efficiency, clean coal, integrated gasification combined cycle, liquefied natural gas, carbon capture and storage, combined heat and power, methane capture and use, civilian nuclear power, geothermal, rural and village energy systems, advanced transportation, building and home construction and operation, bio-energy, agriculture and forestry, hydropower, wind power, solar power and other renewables 	
The EU and China Partnership on Climate Change	
<ul style="list-style-type: none"> • <i>Objectives:</i> to develop and demonstrate, in China and the EU, advanced zero emissions coal technology; to significantly reduce the cost of key energy technologies and promote deployment and dissemination • <i>Areas:</i> energy efficiency, energy conservation and new and renewable energy; clean coal; methane recovery and use; carbon capture and storage; hydrogen and fuel cells; power generation and transmission 	
The Australia-China Climate Change Partnership	
<ul style="list-style-type: none"> • The Parties envisage joint activities in the following <i>areas:</i> climate change science, including detection, analysis, projection, and uncertainty; climate change policies and measures; climate change impacts and adaptation; greenhouse gas inventories and projections; technology cooperation; capacity building and public awareness; renewable energy and energy efficiency; any other areas that may be mutually decided by the Parties 	
The US-China Working Group on Climate Change	
<ul style="list-style-type: none"> • The US and China identified ten <i>areas</i> for cooperative research and analysis: non-CO2 gases, economic/environmental monitoring, integrated assessment of potential consequences of climate change, adaptation strategies, hydrogen and fuel cell technology, carbon capture and sequestration, observation/measurement, institutional partnerships, energy/environment project follow-up to the World Summit on Sustainable Development, existing clean energy protocols/annexes 	

Table 2.5. China's international technological cooperation in different partnerships. Source: Wang 2006.

2.4.2. India

India has always held strong views on what the fundamentals of an international climate regime ought to be. It stresses principles of historical responsibility, common but differentiated responsibilities and the right to development. This implies of course that developed countries have to take the lead in combating climate change. During SOGE, the Indian government representative pointed out as one of its concerns that Annex I Parties are not meeting their emission reductions and not fulfilling promises on transfer of finance and technology (UNFCCC 2005). The Indian position is close to the contraction and convergence framework (see chapter 5) in that it pleads for an international distribution and a convergence of emissions on a per capita basis (Bhandari 2005). Equity is perceived as a key issue for a future regime. In general, Indian policy-makers feel that it is premature for India to take any legally-binding GHG emissions reduction commitments post 2012, since this would endanger its development aspirations. One of the conclusions of the IGES consultations (see § 2.3.2.) was that in order to achieve a future regime that enables India to meet developmental and environmental concerns, Indian negotiators have to develop a more proactive position in climate negotiations. For a future regime, CDM is perceived as an important means of financial and technological transfer (and India is currently one of the most active players on the CDM market). In the context of the recently started long-term dialogue on further action, India even advises Annex I Parties to attach more importance to CDM in the post 2012 period, since in this way “Annex I Parties could adopt more ambitious emissions reduction targets, without incurring excessive costs”, while simultaneously helping “to (i) moderate the increasing emissions originating in developing countries by adopting latests technologies, and (ii) generate funding for adaptation in Developing Countries, since 2 percent of CDM funds are devoted to adaptation” (UNFCCC 2006a).

Population (2004)	1.079 million
Annual Population growth (2004)	1,43%
Income per capita (2002 \$ GDP-PPP)	2.572 \$
Annual GDP growth (2004)	9,50%
GHG emissions (2000)	1.884 million MtCO ₂ e
GHG emissions per capita (2000)	1,9 MtCO ₂ e
CO ₂ emission growth 1990-2002 In MtCO ₂ In % change (CO ₂ figures exclude land use change and forestry)	457 MtCO ₂ 70%
GHG intensity level and trend Tons of CO ₂ e / \$mil. GDP-PPP (2000) Intensity (CO ₂ only) % change 1990-2002 GDP % change 1990-2002	768 -9% 87%

Table 2.6. Key statistics for India. Source: Jung et al.(2005), Baumert et al. (2005)

These positions can partially be explained by the particular socio-economic situation of the country. India ranks fifth in total emissions after the USA, China, the EU-25 and Russia, but has a very low level of GHG emissions per capita (only a fifth of the world average). Based on the notion of per capita emissions, Indian emissions will remain low even in a strong growth scenario. However, since India is the second most populous country in the world, aggregate emission levels are high. There is also a

strong divide within the country, with on the one hand a burgeoning middle- and high-income population with increasingly energy-intensive lifestyles, and on the other hand one fifth of the population living on less than US\$1 per day and 56% of households without electricity supply, and this latter problem is growing worse as new connections to the grid fail to keep pace with population growth (Jung 2005, Bradley and Baumert 2005). This problem of energy supply and security is one of the main reasons why India is not willing to take on legally-binding emission reductions, and more, why it is nearly impossible to persuade India to control its growth of emissions if Annex I countries fail to achieve their emission reduction commitments.

To support its position, India has advanced a “lifestyle argument” during SOGE, based on research from The Energy and Resources Institute (TERI). This research further develops the argument formulated several years ago by Agarwal and Narain (1991) that there is a need to distinguish between “survival” emissions of developing countries and “luxury” emissions in developed countries. The TERI research shows that low per capita GHG emissions in India are not due to poverty alone, but also to more sustainable lifestyles than in developed countries. For example, CO₂ emissions from the agricultural sector – from the field to the table – are about 0,1 tons CO₂/million calories in India against 1,7-2,2 tons in developed countries, inter alia due to a less meat-based diet. CO₂ emissions from transportation per passenger kilometre are 16 gram in India against 118 and 193 gram in the EU-15 and the US (UNFCCC 2005, 70).

While on the one hand India asserts its need and right to emissions growth for development purposes, it has also several policies and reforms in place to moderate emission intensive growth. Due to its high dependence on fuel wood and coal – the country is the third largest producer of coal after China and the US – India’s energy system is highly carbon intensive and it faces the considerable difficulty of utilising its natural resources without increasing carbon emissions considerably (Jung 2005). After climbing steadily for at least two decades, India’s energy, power and carbon intensities all began to decline rapidly after 1995. This shift suggests a start of decoupling of energy and economic growth, as has historically occurred in industrialised nations at higher per capita income levels (Chandler et al. 2002). While motivated primarily by energy security, economic concerns or local environmental issues, these policies have kept actual emissions significantly lower than trend emissions predicted, and can thus “be construed as part of India’s meaningful participation” in the global efforts to mitigate climate change (Bhandari 2005, 12). TERI analysis shows that Indian sectoral policies currently underway (such as cleaner fuel for power generation, electricity supply with decentralised renewable options and a 20% increase in the share of public road transport – see also figure 2.1.) will produce considerable climate change co-benefits through lower CO₂ intensity and emission growth beneath trend emissions.

A last major concern of India is the problem of adaptation to climate change. During COP-8 in India, the Delhi Declaration focused the attention on the importance of adaptation. A vast majority of the Indian population is dependent on climate sensitive sectors such as agriculture, forestry and fisheries (Bhandari 2005). With 65% of Indian agriculture dependent on rainfall, any adverse impacts on water availability due to glacier retreat, decreased rainfall and increased flooding would threaten food security. Increase in mean temperature could impact rice yields and exacerbate drought impacts

in the country's poorest districts. In the absence of protection, a 1-meter sea level rise could displace 7 million people and submerge 500.000 hectares of land. Improving adaptive capacity of people and ecosystems is thus a big challenge, but currently, taking effective measures is impeded by a lack of strong institutional mechanisms, financial resources and capacity to assess vulnerability and impacts (Jung 2005). Besides, adaptation concerns are currently no issue in Indian development planning.

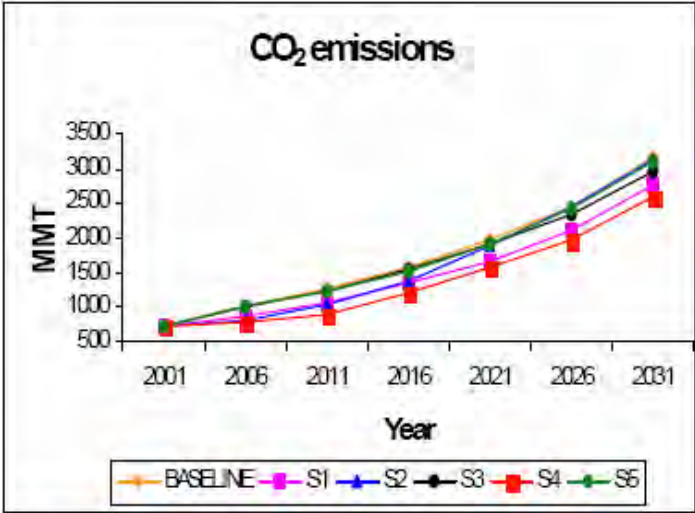


Figure 2.1. Projected CO₂ emissions India, in a baseline scenario and under scenarios with different assumptions. **Baseline:** base year 2001, GDP growth 8%, IPCC emission factors, official demographic projections, 8% discount rate. **S5:** baseline with GDP growth 6,7%. **S1:** cleaner fuels for power generation. **S2:** electricity for all by 2012, decentralised renewable options, efficient cook stoves. **S3:** 20% increase in share public road transport, greater CNG use in buses, taxis, 3-W vehicles. **S4:** S1+S2+S3 (Source: UNFCCC 2005)

2.4.3. Brazil

Brazil ranks eighth in the top of GHG emitting countries, and is thus always counted amongst the major emitters, although the Brazilian government has repeatedly expressed its discontent with this terminology. The reason is that the government thinks historical emissions are far more representative of national climate change responsibility than current emissions (La Rovere and Pereira 2005). The well-known “Brazilian Proposal” is built on the principles of historical responsibility and common but differentiated responsibilities, and was meant to establish an objective criterion to measure the responsibility of each country in causing the climate problem and to have a basis for burden-sharing in combating climate change. Simultaneously, the Brazilian government has expressed its deep commitment to the Kyoto process in recent statements and its fear that uncertainties of the post 2012 regime could undermine the credibility of the Kyoto regime (UNFCCC 2005).

In the post-2012 discussion, Brazil currently proposes a two-track approach. Under the “Kyoto Track” Annex I countries should take on “significantly stricter” GHG emission limitation and reduction targets, since this is essential to ensure the continuation of the international climate regime as a

whole. The “Convention Track” is intended to stimulate voluntary action solely in developing countries. “Efforts undertaken by developing countries to reduce emissions in different sectors within their territories can only be characterized as voluntary and, therefore, cannot be linked to goals, targets or timeframes” (UNFCCC 2006b). New arrangements under the Convention should provide positive incentives to developing Parties. More in general, Brazil thinks that globalisation and sustainable development should go hand in hand, but that currently, the globalisation process is the most powerful instrument of the dissemination of the unsustainable production and consumption patterns of industrialised countries. The Brazilian government attaches a lot of importance to the CDM, because it thinks it can be an effective means to avoid unsustainable patterns of development, to engage developing countries in meaningful participation, and to allow the population of developing countries to meet their legitimate aspirations of raising their living standards in ways that are compatible with sustainable development (UNFCCC 2005).

Population (2002)	174 million
Annual Population growth (2002)	1,3%
Income per capita (2002 \$ GDP-PPP)	7480 \$
Annual GDP growth (2004)	...
GHG emissions (2000)	851 MtCO ₂ e
GHG emissions per capita (2000)	5,0 MtCO ₂ e
CO ₂ emission growth 1990-2002 In MtCO ₂ In % change (CO ₂ figures exclude land use change and forestry)	125 MtCO ₂ 57%
GHG intensity level and trend Tons of CO ₂ e / \$mil. GDP-PPP (2000) Intensity (CO ₂ only) % change 1990-2002 GDP % change 1990-2002	679 17% 35%

Table 2.7. Key statistics for Brazil. Source: Baumert et al. (2005), La Rovere et al. (2004)

After all, although Brazil is one of the fifteen largest economies in the world, more than 20% of the population lives in poverty, while 10% has no access to electricity. National priorities are social and economic (growth, eradicating poverty, improving health conditions) and Brazil is not willing to compromise its right to development. The country is an important producer of manufactured products (such as cement, aluminium, chemical products) and a large agricultural producer (with amongst others 170 million cattle heads and crops such as soybean and sugar cane).

The Brazilian record of GHG mitigation shows a dual face. On the one hand, Brazil is famous in the climate community for some of its policies and programs which have kept GHG emissions under control (although they were not meant for that). The country has a fairly low level of energy-related carbon emissions because it derives almost half of its energy from hydropower and biomass; in the case of electricity even 95% is generated by hydroelectric power plants, so that the generation of electricity emits almost no greenhouse gases (Ministry of Science and Technology 2004). The most famous program is the National Alcohol Program (Proalcool), developed in the 1970s when Brazil faced two seemingly unrelated challenges: the oil crisis with its huge rise in prices and a sugar crisis with low world market prices. The answer to both problems lay in the production of ethanol from sugarcane. The government implemented wide-ranging measures to ensure that ethanol became a

significant part of the transport fuel mix. The socio-economic benefits included reduced import costs, reduced debt service payments, over a million jobs in rural Brazil and improvement of air quality (Bradley et al. 2005). The incidental climate benefits are in the order of 600 million tons of CO₂ saved since 1975, or 10% of cumulative CO₂ emissions, (ibid.). Apart from the alcohol program for transport, other measures with GHG mitigating effects include the use of sugar-cane bagasse to generate electricity³⁹, the development of a natural gas industrial market and several demand-side measures (e.g. mandatory efficiency standards for household appliances, lighting products and motors).

The further development of the Brazilian economy will undoubtedly lead to an increase in energy use. An influential government-sponsored study, the CNPE⁴⁰ scenario, projects Brazilian GDP growth of about 5% per year for the next two decades, with energy use that will nearly double from 2000 to 2020. An alternative scenario, assuming that the kind of measures discussed in the previous paragraph will continue over the long term, finds emissions that fall below the CNPE scenario by 18 million tons of carbon by 2010 (or 13%) and by 45 million tons in 2020 (or 20%) (Chandler et al. 2002, see La Rovere et al. 2004 for a detailed discussion). These savings can potentially be larger when Brazil succeeds in introducing alternative sources of power generation. The country has expressed a major interest in forms of renewable energy, in particular to provide reliable and affordable energy services to rural populations and the Amazonian population. It is hoped that CDM projects will be helpful in providing the technology.

While the energy-related programs and measures have provided a broad range of benefits for the Brazilian economy and helped lower carbon emissions, little or no progress has been made in reducing emissions from the land use, land use change and forestry sector (LULUCF), which accounts for 75% of total CO₂ emissions. Within this sector, emissions from "forest and grassland conversion" amount to 92% of total LULUCF (Ministry of Science and Technology 2004, 87), which essentially means deforestation. Causes of deforestation include crop growing (including export crops such as soybeans) and cattle ranching, timber extraction, large-scale projects such as hydro dams, development of the highway system, unequal land distribution etcetera. In spite of several government programs and measures, the deforestation problem is not under control. In the 1990s, the deforestation rate was on average around 16.000 km² per year and a peak of 25.059 in 1995 (ibid., 249). A top priority for carbon mitigation is the adoption of specific measures to curb forestation (Chandler et al. 2002). Due to the dimensions of the problem, deforestation and LULUCF is a sensitive topic for the Brazilian government. In general, Brazil considers deforestation as a domestic problem and not something to be addressed in international climate negotiations.

Finally, in the field of adaptation the Brazilian government and several researchers have signalled a lack of key data and analysis to assess the vulnerability of Brazilian society and ecosystems to climate change (Ministry of Science and Technology 2004, La Rovere et al. 2004). Major concerns include: drought in particular in the Northeast, and its impact on agriculture (importance of crops such as corn, soybean, wheat for the country's GDP) and hydroelectric generation (electricity sector dominated by hydroelectricity); floods in various region, including the metropolitan region of Rio de

³⁹ Bagasse is a waste by-product of alcohol production and is used in cogeneration plants.

⁴⁰ National Energy Policy Council

Janeiro; vulnerability of densely populated coastal zone for sea-level rise; health and transmission of infectious diseases whose vectors and parasites are sensible to climate change (malaria, dengue). However, there are currently no reliable projections of possible future climates. A better representation of the Southern hemisphere in General Circulation Models would improve assessments in terms of projecting regional temperature increase, rainfall patterns changes, increase in the frequency and magnitude of extreme events and sea-level rise (La Rovere et al. 2004).

2.4.4. South Africa

South Africa is the strongest economy on the African continent, but the legacy of Apartheid still heavily influences South African policies. A central driver for policy since the democratic elections in 1994 has been the redress of the imbalance of Apartheid and the promotion of the socioeconomic development of poor communities (Mwakasonda and Winkler 2005). This is also reflected in the way the country approaches its climate policy. National priorities include alleviation of poverty, provision of basic services for all South Africans, equity, employment creation and economic growth. Policies and measures to combat the effects of climate change have to be developed within the context of these priorities (RSA 2000). In 2004, the Cabinet approved a national climate change response strategy which is built around sustainable development. This is an important point of departure because the economy of South Africa is predominantly based on energy intensive industries and coal is by far the main energy source. With its base in sustainable development, the climate strategy wants to reach several goals simultaneously: managing the environmental impacts of energy supply and use, increasing access to basic energy services and stimulating a competitive economy. The access to grid electricity exemplifies this need to mix policy objectives. In 1993 only 36% of the total population had access to grid electricity. The government endorsed a National Electrification Programme, with the aim of providing access to electricity, mainly in previously disadvantaged and rural areas, and for all schools and clinics without electricity. By 2000, 3,4 million connections were made, with a backlog of unelectrified households at 3,65 million households. Government plans are to continue to electrify 300.000 homes per year (Mwakasonda and Winkler 2005). While increasing access to energy may increase emissions, it is fundamental to social and economic development, and it has important local environmental and health benefits. The use of paraffin, coal, wood, candles and batteries is displaced, thus reducing local and indoor air pollution as well as tree cutting (Chandler et al. 2003).

GHG emissions in South Africa are strongly related to the production and consumption of energy. According to the Initial Communication under the UNFCCC (SAR 2000), the South African energy sector contributed 78% of the total emissions in 1994 (calculated as CO₂e), agriculture contributed 9,3%, industrial processes 8% and waste 4,3%. Carbon dioxide is with 83,4% the most significant greenhouse gas, while the main source of CO₂ emissions is from the energy sector, which generated 91,1% of total CO₂ emissions. The high level of emissions from the energy sector relates to the high energy intensity of the South African economy, which is dependent on large scale primary extraction and processing, particularly in the mining and minerals beneficiation industry (ibid.).

Population (2003)	44,8 million
Annual Population growth (1999)	2,1%
Income per capita (2002 \$ GDP-PPP)	9.750 \$
Annual GDP growth (2003)	2,2%
GHG emissions (2000)	417 MtCO ₂ e
GHG emissions per capita (2000)	9,5 MtCO ₂
CO ₂ emission growth 1990-2002 In MtCO ₂ In % change (CO ₂ figures exclude land use change and forestry)	69 MtCO ₂ 23%
GHG intensity level and trend Tons of CO ₂ e / \$mil. GDP-PPP (2000) Intensity (CO ₂ only) % change 1990-2002 GDP % change 1990-2002	1.006 -3% 27%

Table 2.8. Key statistics for South-Africa. Source: Baumert et al. (2005), EDRC (2003)

The energy sector relies heavily on coal: three-quarters of South Africa's primary energy supply and 93% of its electricity are derived from coal. South Africa has about 60 billion tonnes of coal reserves, which is sufficient to meet demand (SAR 2000). Even in optimistic scenarios, coal continues to provide for the majority of South Africa's energy needs over the next 20 to 30 years (Mwakasonda and Winkler 2005). In this situation, it is clear that the major potential for mitigation in South Africa lies in the energy sector. On the supply side, clean coal technologies will have to play an important part, but also a diversification of the mix of energy sources. E.g. the government has set a voluntary renewable energy target of 10.000 GWh by 2013; other possibilities include the substitution of synthetic fuels derived from coal – a capacity developed to meet fuel needs during the isolation of the apartheid regime – with natural gas and hydroelectric power to be obtained from neighbouring countries of the Southern African Development Community (Chandler et al. 2002). On the demand side, energy efficiency can be improved significantly. Areas for improvement are in particular industrial export sectors such as mining, iron and steel, aluminium, ferrochrome and chemicals, where the abundance of cheap coal for generation has provided little incentives for efficient use of energy (Mwakasonda and Winkler, 2005). The government has formulated a national target of energy efficiency of 12% by 2015 (compared to 2000), where also the residential sector is included. Mwakasonda and Winkler warn however that international trends show that countries like South Africa become receptors of energy-intensive investment as developed countries shed these in favour of more service-oriented and lucrative activities (ibid., 4). According to Chandler et al. (2002), the lessons South Africa will learn from these kind of policies in reforming its economy and providing a higher quality of life for its citizens could serve as an instructive example for other developing countries.

In the domain of adaptation, the sectors which have been identified as the highest vulnerable to climate change are the health sector, maize production, plant and animal biodiversity, water resources and rangelands. As in most developing countries, the poorer layers of the population and these dependent on ecosystems (such as farmers) are most vulnerable. In the field of health e.g., concerns due to projected climate change include the extension of malaria prone areas (7,8 million people at risk, with 5,2 million not previously resident in malaria risk areas) and a larger area conducive to the survival of the schistosomoa parasite and the snail host. Under the heading adaptation, the South African government has also expressed concerns over the potential impacts of response measures by

Annex I countries. South Africa is the number two coal exporter, with 80% of its exported coal going to Annex I countries. A reduction in the use of coal in Annex I countries would probably have a negative impact on the South African economy.

On the issue of the post 2012 climate regime, South Africa draws a clear distinction between the process taking place under Article 3.9 KP and the process under the dialogue on long-term cooperative action (RSA 2006). Further commitments for Annex I Parties should be negotiated under Article 3.9 KP, while the dialogue should focus on incentivising actions by developing countries, both in the fields of mitigation and adaptation. A positive incentive approach should enable developing countries to make development more sustainable, thus meeting basic needs while avoiding greenhouse gas emissions. Positive incentives for avoiding deforestation were discussed in Montreal, but positive incentives should be broadened to (a) forms of funding for sustainable development policies and measures (SD-PAMs), (b) addressing adaptation, e.g. through a risk-sharing mechanism in which multilateral funding leverages the resources of the (re)insurance industry, (c) forms of long-term concessionary loans through multilateral channels for the deployment of lower GHG technologies, and (d) expanding the CDM mechanism to programmes, policies and/or sectoral crediting mechanisms. South Africa demands a specific workshop in the positive incentives approach.

With this point of view, South Africa seems to express a willingness to participate in a future climate regime through a form of non-binding commitments. Two specific approaches which over the last years have been discussed in literature and at climate fora, appear in the South African submission for the dialogue, i.e. the SD-PAMs approach and the approach of 'no-lose targets' (see also chapter 5). Of course, taking on non-binding commitments will not be done unconditionally. South Africa hopes for a plan of action with commitments for all Parties under Article 4.1., but depending of the availability of finance (art. 4.3), transfer of technology (art. 4.5) and Annex I implementing their commitments (art. 4.7).

2.5. The most vulnerable countries: LDCs and SIDS

Two categories of countries which have been identified in table 2.1., do not have a lot of political influence, do not have a lot of influence on the climate system, but will nevertheless amongst the hardest hit when climate change gets more intense. These are the groups of Least Developed Countries (LDCs) and of Small Island Developing States (SIDS).

The LDC group is a distinct group in the United Nations system, currently made up of 50 countries. The majority of these countries are African, so their concerns are partly covered in paragraph 2.3.1. Others include several SIDS (see further), and amongst others several Asian countries such as Afghanistan, Bangladesh and Bhutan. All of them are very vulnerable for the consequences of climate change, amongst other things because high percentages of their population are dependent on ecosystems (e.g. farming, fishing), ecosystems are already under pressure (e.g. from desertification), and resources and adaptive capacity are low. Although the LDCs are a distinct group, in negotiations

they normally act under the umbrella of the G77. As such they have had difficulties in making their voices heard. The LDC group usually stresses two themes.

The first one is the absolute necessity of deep emission cuts in industrialised countries. They stress that their survival depends on prevention of dangerous climate change. "It is a question of Northern lifestyles being threatened, but of Southern lives", as it has been worded by the prime minister of Bangladesh (Ahmed, s.d.). LDCs also want emission reductions by industrialised countries not party to the Kyoto Protocol. When climate cannot be stabilised, all efforts towards social and economic progress will be frustrated, including meeting the Millennium Development Goals (Reazuddin, s.d.). To build their economies in a climate-friendly way, they ask for access to climate-friendly technologies and application of the CDM which allows for pro-poor projects with high sustainable development benefits.

The second concern is of course adaptation. LDCs need adequate funding and resources for adaptation needs, but also ask compensation for damages from unavoidable impacts. Most LDCs are preparing or have prepared National Adaptation Programmes of Action (NAPAs), but now of course resources are needed to implement these programmes. Existing mechanisms such as the LDC Fund cannot fulfil the needs for the moment. Reazuddin, current chair of the LDC group in the climate negotiations, therefore suggests that "if voluntary contributions do not deliver, then binding commitments might be needed to secure enough funding to implement NAPAs" (ibid.).

The Small Island Developing States (SIDS) are also a distinct group within the UN system, but in the climate negotiations they act under the umbrella of AOSIS, the Alliance Of Small Island States. AOSIS has always been an active participant in the climate negotiations, strongly motivated by the fact that a lot of islands may literally disappear because of rising sea levels⁴¹. Representatives of AOSIS have repeatedly stated that dangerous levels of greenhouse gas concentrations have already been reached some way back (see e.g. the Tuvalu statement, SOGE 2005). Consequently, all countries have to take measures to reduce emissions, Annex I Parties and non-Kyoto Parties, but also non-Annex I Parties. In the latter case, AOSIS pleads for a voluntary emission reduction process, based on energy efficiency, renewable energy and an expansion of the scope of the emission trading scheme (but a limiting of CDM by Annex I countries). At SOGE, the Tuvalu representative pleaded furthermore for decarbonisation of international financial institutions and the establishment of rules to hinder the promotion of environmentally problematic technologies such as nuclear power (ibid.).

Adaptation is crucially important for SIDS. Adaptation policy should not remain at the level of negotiations and action plans, but implementation has to start immediately, according to AOSIS. Of course, this will demand capacity and funding. AOSIS criticises current funding possibilities, because they are tied to e.g. incremental costs or co-financing and consequently hinder adaptation action on the ground (ibid.). Proposals include a new Adaptation Financial Facility, outside the GEF but managed under the COP; new sources of funding such as a fossil fuel levy; an insurance facility to meet restorative costs.

⁴¹ A few weeks before COP11, the government of Papua New Guinea announced that the Cateret Islands (with 980 inhabitants) had to be evacuated because of rising sea levels. Over the next two years, the inhabitants will be moved to the island Bougainville.

2.6. Conclusions

From the discussion so far, at least three conclusions can be drawn. The first relates to the importance of analysis at the level of individual countries. In order to get a grasp on the complicated problem of climate politics, it is logical that one tries to group countries on the basis of common features (geography, socio-economic characteristics, emission profiles...). This might then lead to a common post 2012 approach for these countries. The description of several countries from the category “major emitters” shows however that circumstances and characteristics of countries can differ enormously. This is without doubt true for other categories as well. Consequently, hoping that some developing countries will take on forms of non-binding commitments for the post 2012 period, will demand an approach which is flexible enough to fit the circumstances of these countries. Yamin and Depledge remark that “unlike the relatively cohesive Annex I group, non-Annex I Parties have very diverse social, economic and political circumstances and cultures, calling for bespoke solutions rather than ‘off the peg’ solutions (...) There is an urgent need for broader groupings of researchers, particularly from the South, to take the lead in conceptualising future next steps, and to scrutinise and challenge methodological, technological and political assumptions in response to realities on the ground” (Yamin and Depledge 2005, 569). There may be a role for developed countries here as well, e.g. in providing forms of capacity building and finance to support Southern researchers and governments in analysing individual countries’ situations (see also chapter 6 on possible entry points for Belgium).

Secondly, and following from the previous point, it may become even more difficult than in the past for developing countries as a group to defend all these different interests during negotiations. Currently, negotiating positions are determined within the G77 and China group, and defended by the spokes(wo)man of the group (with regularly some dissenting voice). But as the impacts of climate change become more real and the pressure to act as well (in mitigation or adaptation), the diversity and regularly opposing interests in the group will make it more difficult to negotiate equitable deals for all countries. It remains to be seen whether this will be at the cost of countries or country groups with least political power, i.e. groups such as the LDCs and SIDS.

Thirdly, as has already been said in the introductory paragraphs of this chapter, three recurrent themes can be distinguished in the literature on post 2012 and developing countries: integrating climate change mitigation with (sustainable) development, adaptation to imminent climate change, and the architecture of the climate regime. These will be dealt with in more detail in the following chapters.

Chapter 3. Making development climate-friendly and more sustainable

3.1. The necessity of bringing developing countries on board

Preventing dangerous climate change implies keeping GHG concentrations in the atmosphere below certain levels. The Third Assessment Report of the IPCC (TAR, IPCC 2001) has shown how different concentration levels of GHG are related to different forms of impacts. Building on TAR, it is generally assumed that in order to keep the global average temperature from rising more than 2°C above pre-industrial levels, concentrations of GHG should not rise above 550 ppm, and preferably not above 450 ppm. Current levels are over 380 ppm. However, new evidence since 2005 indicates that the impacts of climate change may be more serious than previously thought, and that keeping temperature increase below 2°C may demand stricter emission limits. Figures which currently circulate (see e.g. Meinshausen 2005) suggest that the risk of overshooting 2°C equilibrium warming lie between 68% and 99% for stabilisation at 550 ppm CO₂e. Only at levels around 400 ppm CO₂e are the risks of overshooting low enough (between 2% and 57% with mean 27%) so that the achievement of a 2°C target can be termed “likely” (see also figure 3.1.).

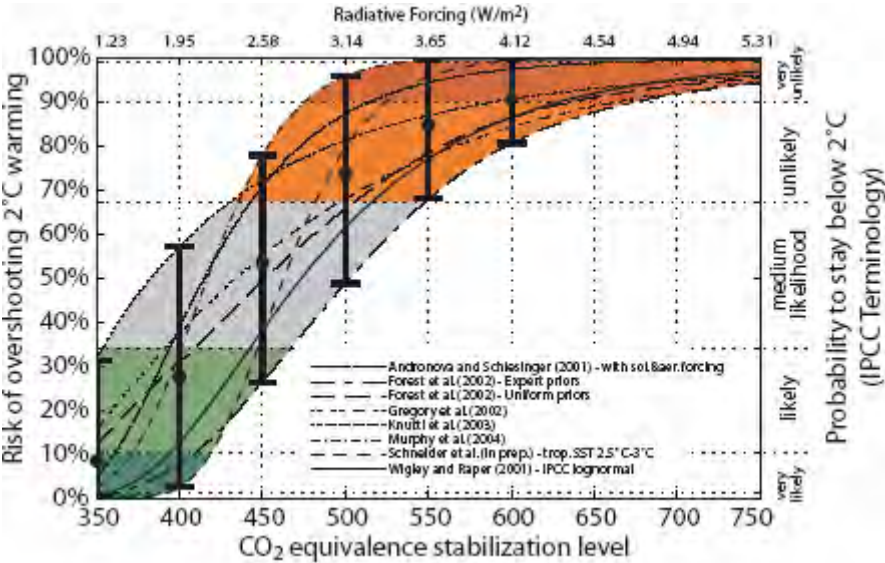


Figure 3.1. The risk of overshooting 2°C global mean equilibrium warming for different CO₂ equivalent stabilisation levels (Source: Meinshausen 2005)

Research from amongst others Meinshausen (2005) and Den Elzen and Meinshausen (2005) show that when emissions peak around 2015 below 475 ppm CO₂e and stabilise around 400 ppm CO₂e, the 2°C target remains within reach. This implies however that global emissions can initially rise, but will have to be 40% to 50% lower by the year 2050 compared to 1990 levels. In this analysis, the longer

mitigation action is delayed, the higher reduction rates will have to be in order to reach a stabilisation level of 400 ppm CO₂e. Figure 3.2 shows a default pathway where emissions peak between 2010 and 2013 and emission reductions per five years are approximately 14%. The rate of global emission reductions might double by 2025 to 31% if the onset of stringent global mitigations is delayed by 10 years until 2020 in Annex-I and 2025 in non-Annex I countries (Meinshausen 2005, 5). The IPCC's Fourth Assessment Report (AR4), due in 2007, will undoubtedly shed more light on this discussion, but what is becoming increasingly clear over the last few years, is that serious mitigation action is urgently needed.

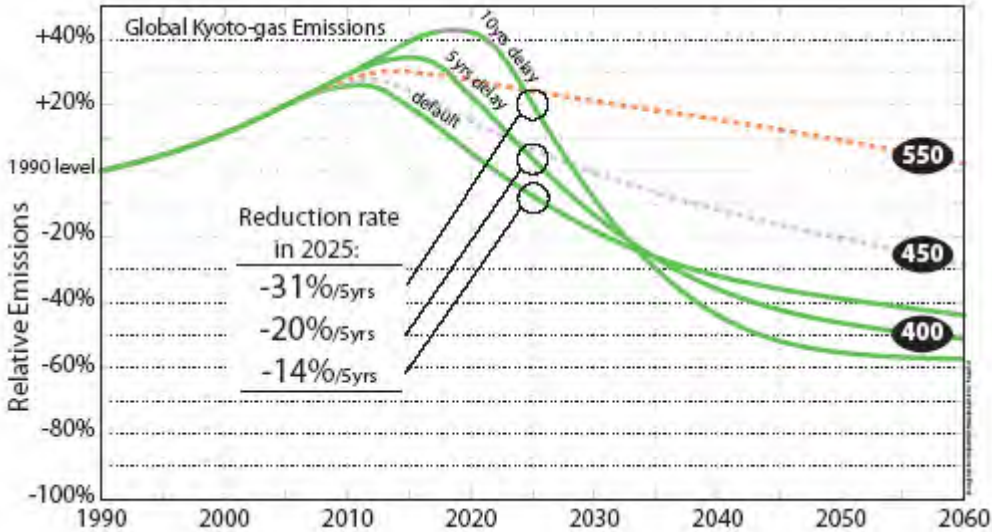


Figure 3.2. Global Kyoto-gas emissions for stabilisation at 550, 450 and 400 ppm CO₂e, including 2 delayed sensitivity variants (solid lines) (Source: Meinshausen 2005).

As has been discussed in chapter 1, the UNFCCC and the Kyoto Protocol have several equity provisions which explain why developed countries – the source of most past and current emissions of GHG – are currently the only ones with binding emission reductions. Developed countries, including the USA, will have to continue leading the efforts in combating climate change over the next decades. However, it is equally clear that in the near future, developing countries, in particular major emitters, will have to take part in these efforts as well. This is not only clear from the analysis above, but also from some figures on characteristics of developing country emissions.

Baumert et al. (2005) give a good overview of some of the essential figures (see also table 2.2 in chapter 2). They conclude that in absolute terms, a relatively small number of countries produce a large majority of global GHG emissions. Together, the 25 countries with the largest GHG emissions account for approximately 83% of global emissions, while the 140 lowest emitting countries account for only 10% of annual emissions (included are LDCs and many SIDS). Most of the largest GHG emitters have large economies, large populations, or both. Developing countries included in the 25 largest emitters are: China, India, Brazil, South Korea, Mexico, Indonesia, Iran, South Africa, Saudi Arabia, Argentina, Pakistan.

Emission growth rates are highest among developing countries, where collectively CO₂ emissions increased by 47% over the 1992-2002 period. Emissions in the EU declined slightly over this period, but the US, Canada and Australia also had significant growth figures of GHG. Furthermore, all emission projections, although inherently uncertain, suggest very large increases in worldwide GHG emissions over the coming decades. GHG emissions from developing countries will probably surpass those from developed countries within the first half of this century. Metz et al. (2002) show that for stabilisation at 450 ppm, reducing emissions of industrialised countries to zero and letting developing country emission trends untouched would not be enough. Developing countries would emit so much that the 450 ppm level is quickly getting out of touch. And as has been shown above, recent research suggests that only at stabilisation levels of 400 ppm CO₂e, it is likely that the increase of the global mean temperature can be kept below 2°C.

Consequently, an international climate regime which aims at keeping climate change within limits, and given the stabilisation levels cited above, will need to encompass all major emitters, including the US and developing countries. One of the conclusions of Baumert et al. (2005) is that “this holds true even for those major emitters that have other more pressing priorities, such as India, South Africa, and Indonesia. The challenge instead is determining the appropriate strategies in these countries – and in developed country assistance programs, including capacity building – for slowing and eventually reversing GHG emissions growth. Although there are over 100 countries that have both low income and emissions levels, ensuring that these countries are engaged in mitigation efforts seems less critical to achieving the objectives of the Climate Convention “ (ibid., 39).

The crucial phrase here is “determining the appropriate strategies in these countries”, and determining whether and how these can be translated in an international climate regime. If there is one idea which over the last years has started pervading a lot of the discourse on developing countries and climate change, then it is the idea of aligning ‘normal’ development policies with climate change policies. The terminology can be different – such as ‘development first’, or ‘development and climate’, or ‘sustainable development policies and measures’ – but the logic is similar: the priorities in developing countries are poverty alleviation, food supply, health, access to modern energy services and transportation, but many of these development priorities can be met in a manner consistent with climate mitigation. This can form the basis for some form of internationally acknowledged participation of developing countries in the climate regime. Of course, as has been discussed in the first chapter, the need for integrating climate change and sustainable development is already recognised in the UNFCCC and the Kyoto Protocol. But between recognition and development of national and international policies to bring this into practice and recognise it as part of an international regime, there is still a big gap.

However, this kind of approach is gaining more attention at the international level, e.g. during the *Ministerial Indaba on Climate Action*, an informal meeting of Ministers and Heads of Delegation from 22 countries who met in South Africa (17-21 June 2006; a follow-up on the so called Greenland dialogue of 2005). The preparatory policy discussion paper for this conference pays a lot of attention to the idea that making development more sustainable can make a major contribution to climate change goals (RSA 2006). The Chair’s summary of the meeting states that “The co-benefits of

sustainable development for climate action were broadly accepted. Ministers shared the view that developing countries are already contributing significantly to emission reductions through a range of domestic policies, but that these actions are insufficiently recognized, measured and communicated. Many Ministers expressed interest in further exploring Sustainable Development Policies and Measures (SD-PAMs) as one possible means to register action by developing countries in the Convention process (...) Specific ways of capturing the climate co-benefits of sustainable development policies could be further explored under the Convention Dialogue.”

In the rest of this chapter, we first go into some reasons that have given impetus to this line of thinking (3.2.). Then, the two-way connections between climate and development are explored, options for policies and some obstacles (in 3.3). After some critical reflections on the meaning of development (3.4.), the chapter closes with a discussion of the role of technology and CDM (3.5.). It should be clear that the link between climate and development goes further than mitigation. Development policies influence e.g. adaptive capacity, but in order not to complicate the discussion too much, these links are further explored in chapter 4.

3.2. The case for integrating development and climate

3.2.1. It is already happening in practice

One reason why attention is turning to the development and climate debate is quite simply the fact that developing country policy-makers and researchers have started realising that what in the past were considered ‘good’ development policies and practices, have simultaneously had a lot of mitigating effects on GHG emissions. However, until now these policies and practices have seldom been framed in that way, and consequently not been recognised as such either.

Several examples have already been given in the previous chapter, in particular in the discussion on major emitters. A famous example is the Brazilian ethanol programme which, without that being the intention, saved in the order of 600 million tons of CO₂ since 1975, or 10% of Brazil’s cumulative CO₂ emissions (see also chapter 2). The report from Chandler et al. (2002) investigates development policies in 6 developing countries – Brazil, China, India, Mexico, South Africa, and Turkey – with mitigating effects on emissions. All these countries have over the last three decades installed policies out of concern for economic growth and poverty reduction, energy security and local environmental concerns (such as in particular improved air quality). The analysis of Chandler et al. demonstrates that actions to achieve these and other goals have reduced the growth of their combined annual GHG emissions over the past three decades by nearly 300 million tons a year. Their annual emissions would be about 18% higher than they are today if not for the measures they had undertaken. “To put these figures into perspective, if all developed countries were to meet the emission targets set by the Kyoto Protocol, they would have to reduce their emissions by an estimated 392 million tons from where they are projected to be in 2010” (ibid., 52). As said, the common drivers for these emission reductions were not climate concerns. According to Chandler et al., the most powerful drivers are:

- The concern for economic development that has led to significant market reforms and economic restructuring, in particular policies to make energy prices more realistic and require consumers to pay. These have led to both accelerated growth and reduced energy waste.
- The concern for energy security, in particular measures which are intended to reduce the dependence on imported oil (e.g. in Brazil and India) and diversify the energy supply mix
- Efforts to protect local environments, in particular improvement of local air quality through fuel switching from high- to low-carbon fuels and promotion of energy efficiency (with lower carbon emissions as co-benefit).

Furthermore, this analysis and more recent work (e.g. Bradley et al. 2005) show huge potentials for more large-scale emissions mitigation in these countries. If a suitable structure is found, these could in some way be framed as a form of developing country participation in mitigation efforts. A few examples (from Bradley et al. 2005):

- India: as has also been mentioned in the previous chapter, 56% of households in India have no electricity supply, and the problem is growing worse as new connections fail to keep pace with population growth. Three scenarios are considered to solve the problem. An extension of the grid using India's existing energy generation mix cannot meet the targets, due to fundamental structural problems with India's electricity market. A scenario with off-grid diesel generators has the best potential for quickly delivering electrification, but leads to significant import dependence, and problems of security of supply and local air pollution. A scenario dominated by off-grid renewable energy generation has high incremental cost of capital, but due to the concerns raised about the grid and diesel technologies, there are significant reasons to prefer this scenario on domestic policy grounds, provided that the institutional delivery mechanisms can be put in place. This scenario has the additional benefit of significant CO₂ savings: 14 to 102 million tons per year compared to using the grid.
- China: in particular in urban areas, the growth in car ownership and use is spectacular. This has welfare benefits but also leads to rapidly increasing GHG emissions. Besides, China's dependence on imported oil grows (and the price of oil), and the rapid growth in car use leads to gridlock in cities that were not designed, and cannot be easily adapted, for such traffic. Three scenarios were developed. "The Road Ahead" is a business-as-usual scenario. "Oil Saved" applies measures to curtail oil growth demand and results in 55% reduction in transport energy use by 2020 relative to Road Ahead. "Integrated Transport" also includes measures to reduce the burden on China's urban infrastructure and leads to a 78% reduction. Important measures are: more efficient engine types (hybrids, compressed natural gas); smaller vehicles to adapt to constrained road and parking space; and lower vehicle-miles-travelled as people use public transportation alternatives.
- The Brazilian biofuels program: Bradley et al. state that some 20 other countries might find the Brazilian model attractive. Improved production technology and new flexfuel cars that can run either on gasoline or ethanol, will make implementation easier. Exchange of information and

easier access to relevant technologies, and depending on national circumstances more direct financial support, might be all that is necessary.

Chandler et al. stress that the uniformity of these results and the diversity of cultures and conditions represented in these countries, suggest that developing countries everywhere offer large mitigation potentials. However, there are important barriers to reaping these mitigation opportunities, and of course developing countries have to see the benefits of shaping development in such a way as to combine development objectives with emission reductions and adapting to climate change. This will be further discussed in 3.3.

3.2.2. The concept of alternative development pathways

Apart from what is already visible in reality, there are also more theoretical considerations which have given food to the discourse on climate and development. The central argument here is that individual countries and the world as a whole do not follow predetermined development pathways, but that, depending on policies preferred, different future pathways are possible. These development pathways and the production and consumption patterns associated with them, matter as much for the emissions of greenhouse gases as do climate mitigation policies. Choosing a sustainable development path, where baseline GHG emissions are much lower than in other possible futures, will make it much easier to avoid dangerous climate change.

The recognition that the general development path of society is a determinant of GHG emission at least as important as explicit climate policy, is surprisingly a recent one (Swart et al. 2003). This line of thinking starts from the *Special Report on Emission Scenarios* (SRES) which was written for the IPCC in 2000, in preparation of the TAR. The SRES constructed several families of baseline emission scenarios on the basis of explicitly different packages of socio-economic and technological conditions. The emissions which result from these families are futures *without climate policy*. Major drivers of these scenarios are economic development, population, technology development, energy mix and land-use change. These four families of emission scenarios have been widely published and discussed, and we describe them here only with some key-words (see Nakicenovic and Swart 2000):

- A1: a future world of very rapid economic growth, global population peaking in mid-century and declining thereafter, rapid introduction of new and more efficient technologies, convergence amongst regions, increased cultural and social interactions, substantial reduction in regional differences in per capita income. A1FI is fossil intensive, A1T is based on non-fossil energy sources, A1B on a balance across sources.
- A2: very heterogeneous world, self-reliance and preservation of local identities, continuously increasing population, economic development regionally oriented, per capita economic growth and technological change more fragmented and slower
- B1: often interpreted as the world with the strongest sustainable development orientation. Convergent world with rapid change in economic structure towards a service and information

economy, reductions in material intensity, introduction of clean and resource-efficient technologies, same population development as in A1, emphasis on global solutions to economic, social and environmental sustainability, including improved equity.

- B2: local solutions to economic, social and environmental sustainability, increasing global population, intermediate levels of economic development, less rapid and more diverse technological change than in A1 and B1

The emission profiles resulting from these scenarios are shown in figure 3.3. (in grey shades). The figure also shows how big the gap is between the baseline emissions in the different scenarios and the emission reductions needed to reach different stabilisation levels of GHG emissions (in red and pink, stabilisation levels between 750 ppm and 450 ppm). The higher the baseline emissions and the lower the stabilisation level, the bigger the gap. The SRES scenarios teach different things.

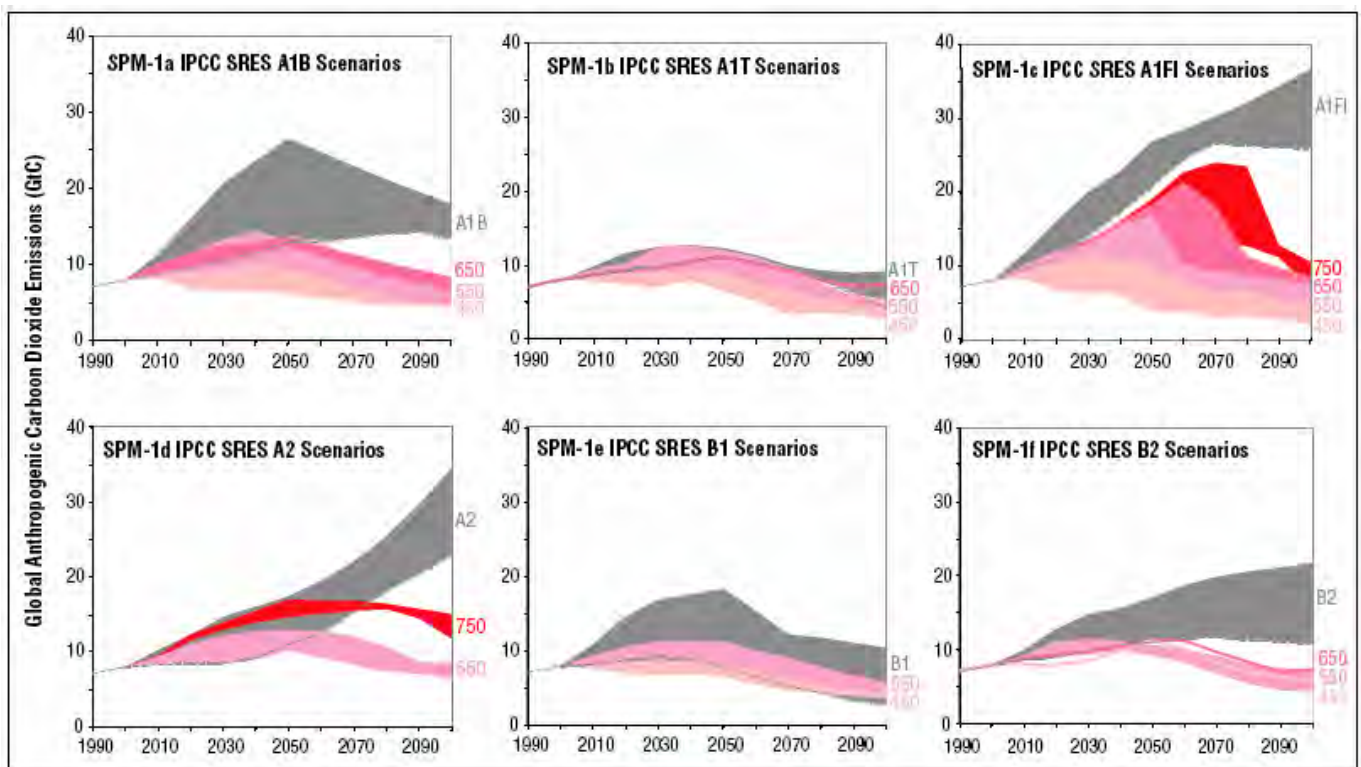


Figure 3.3. Comparison of SRES reference scenarios (grey shades) and scenarios in which CO₂ concentrations stabilise at 750, 650, 550 and 450 ppm. (Source: Metz et al. 2001)

First, the world and individual countries are not just the object of some autonomous development, but human policy choices in a wide range of fields (such as policies in the fields of economics, development, technology, population policy, environment and social issues) co-determine the direction society will be taking the next decades. These choices are important in shaping alternative development pathways, which lead to very diverse futures and emission profiles, and thus associated climate changes. Keeping in mind what has been said above about the possible necessity of choosing a stabilisation level of 400 ppm, it is clear that some of these futures will make it easier to avoid

dangerous climate change than others. In particular, worlds with the characteristics of A1T and B1 are projected to lead to much lower baseline emissions than a fossil-intensive world such as A1FI. Starting from these baseline emissions, mitigation efforts and costs will correspondingly be much lower in A1T and B1 than in A1FI. As has been remarked above, B1 is often interpreted as the world with the strongest sustainable development orientation, in terms of its lifestyle, socio-economic and governance dimensions. Metz et al. (2002) interpret this world as a future in which developing countries align their development goals towards equity, efficiency and sustainability. “Generally, limiting climate change will become more easy if the world would develop into a more sustainable direction as depicted in the SRES B1 scenario. However, this does not mean that this type of world will come about easily. It will require social and institutional change supported by interventions in a much broader area of policy making than environment/climate, like finance, trade, energy, transport, agriculture, etc. and thus also require action in many other international institutions than the UNFCCC, such as IMF, World Bank, WTO and specialised UN agencies” (ibid., 226-228).

A second lesson from SRES is that different worlds can have similar GHG emissions (e.g. A1FI and A2). But also, similar futures in terms of economic and demographic development can have very different GHG emissions because of choices in the area of technology development and consumption patterns (compare the A1 family). Again, this demonstrates that policy choices but also development choices in e.g. industrial sectors and transport, have an important influence on development pathways and thus on GHG emissions, and this independent from climate policies. Swart et al. (2003) describe how choices made in the energy sector are particularly important. Will e.g. conventional oil and gas resources be replaced by coal or unconventional oil and gas resources when reserves decrease, or will they be replaced by non-fossil energy resources? This will be an important driver of whether and at what level CO₂ emissions can be stabilised.

Third, the SRES scenarios show that when climate concerns can become an integral part of non-climate policies, this would lighten the burden of specific mitigation (and also adaptation) policies even more. This so-called mainstreaming of climate concerns in other policy areas would lead to much more cost-effective mitigation and adaptation. Heller and Shukla (2005) state that conventionally, global policymakers viewed climate change as a barrier to development and development as a threat to climate change. Current co-operation efforts and analyses of climate change policy have also been driven uniquely by concerns about climate change. But when one starts thinking in terms of a “development and climate paradigm”, then development – defined as building of capacities, institutions and human capital in developing countries – becomes a key driving force for enhancing mitigative and adaptive capabilities for addressing climate change. The problem then no longer is how to generate political attention for climate change, but to investigate how political problems that are already politically central can be solved in the most climate-friendly and most sustainable development friendly way (Heller cited in Halsnaes and Olhoff, 2001). The next paragraph 3.3. develops this idea further.

This paragraph concludes with an illustration of the consequences in terms of GHG emissions of different development pathways for a country like China, given in figure 3.4. Although development paths are not only a matter of choice, it is nevertheless clear that policies which aim at developing China in the ‘US way’ have completely different consequences from policies developing China in the

'Japan way', and this both for China as well as for the world. Of course, this is not just a question of policy choices in China. Global agreements and policies which aim at sustainable development (or not) will substantially influence China's development choices.

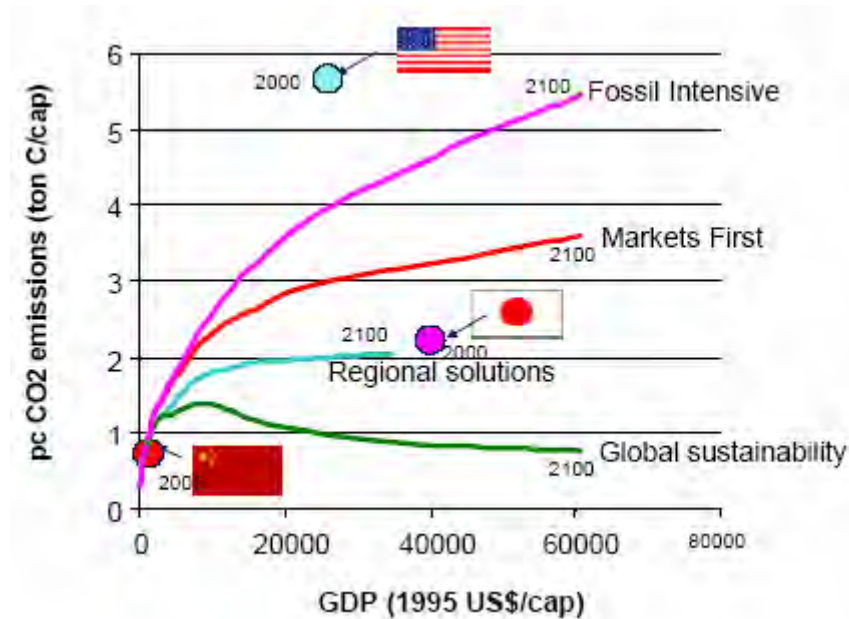


Figure 3.4. Four different development paths for China, compared to current CO₂ emissions and GDP per capita in the US and Japan (Source: Dave et al., 2005).

3.3. Linkages and policy options

With the discussion of the previous paragraphs in mind, the question becomes whether developing countries will be able to capture the huge potentials for more large-scale emissions mitigation which are still present, and even boost their efforts, in that way contributing to world-wide mitigation efforts, while in fact their very first concerns are with 'classical' development issues such as economic growth, poverty reduction, energy security, transportation, urbanisation, health etcetera. Besides, "the activities undertaken to meet these priorities are, in turn, the inputs driving emissions output. For some time to come, developing country emissions will continue to be derivatives of other development choices, and can better be managed if recognised as such" (Heller and Shukla, 2003). Within a climate change context, this implies that these activities and policies will have to become more climate-friendly and/or more sustainable. Conversely, the concept of alternative development pathways shows that mitigation options can be made more attractive and policies and measures more effective if they are integrated within broader socioeconomic strategies aiming at sustainable development (Munasinghe and Swart, 2005). These two insights gain more and more ground in the discussions on developing country participation in the climate regime. What is essential then, is to understand well which linkages there are between climate and sustainable development and which policy options exist for integrating both.

3.3.1. Linkages between climate and development

Swart et al. (2003) state that climate change, its driving forces and its impacts have linkages with all three dimensions of sustainable development: environmental, social and economic. In the environmental realm they cite linkages with stratospheric ozone depletion; urban and regional air pollution; desertification, land degradation and food production; land-use, land-cover change and biodiversity; forestry; quantity and quality of water resources. The linkages are often two-way, e.g. climate change can negatively affect food production, but use of nitrogenous fertilisers in food production also produces the GHG nitrous oxide. Or deforestation releases CO₂ in the atmosphere, while climate change can affect the species distribution and productivity of forest ecosystems.

Important linkages cited by them in the socioeconomic sphere relate amongst other things to economic growth, poverty, health, security and access to environmentally sound technologies. Again, linkages are often two-way. In the case of economic growth, it is obvious that the magnitude and structure of economic development heavily influence GHG emissions, while conversely impacts of climate change on for instance agriculture or water supply can affect economic activity. As for poverty, poor farmers sometimes contribute to climate change through conversion of forests and marginal lands, but conversely, climate change is projected to fall disproportionately on poor people and even increase existing inequalities.

Davidson et al. (2003) see the strongest connection between climate change and development in the issues of food, water, and energy, that are all essential features of quality of life in developing (and other) countries. For energy, there is on the one hand the fact that wood fuel is still the main source of fuel for one third of the world's population. Because of the expectation that wood demand may even double in the next 50 years, this will make forest management and protection more difficult. On the other hand, 1,6 billion people are without electricity, and electricity demand in developing is expected to increase three to five times over the next 30 years, putting pressure on emissions. In the case of water, one-third of the world's population already suffers severe water stress, and populations facing water scarcity may double over the next 30 years, exacerbated by climate change. For food production, it is projected that agricultural productivity in the tropics and sub-tropics will decrease due to climate stresses, but on the other hand, the world population is projected to increase with 3 billion people in the next 30 years, probably demanding a doubling of food production.

Swart et al. (2003) stress that apart from the direct links between climate change and sustainable development, it is necessary "to see both of them as part of a complex system of interactions, ranging from concrete issues of technological choice and innovation, to questions of institutional design and management, through to more abstract questions related to identity, agency, control and power" (ibid., S24). This may seem a somewhat abstract remark, but it underscores a point of view which returns with different authors (e.g. Munasinghe and Swart, 2005): technological options are often considered to be the most important ways to mitigate GHG emissions in a world characterized by continued economic growth and development. In reality, however, technological changes are intricately linked to structural economic and behavioural changes, and to institutional practices. In other words, setting

countries on a more sustainable development path is not just a question of introducing climate-friendly technology, but of linking climate issues to a much broader agenda.

Over the several IPCC Assessment Reports, climate science has developed two concepts which are used to defend the expediency of climate policies, namely the concept of *ancillary benefits* and the concept of *co-benefits*.

Ancillary benefits are positive side-effects of climate change mitigation policies. A well-known example is the link between mitigation of GHG emissions and local air quality. Reduction of fossil fuel consumption in for instance transport or heating contributes of course to climate change mitigation, but also helps the abatement of urban and regional air pollution, and thus reduces health risks⁴². Although according to Munasinghe and Swart (ibid.) there is little agreement on definition, reach and size of ancillary benefits, and on methodologies for integrating them into climate policy, they can be of particular importance in developing countries. When e.g. the existing method of burning fuelwood with a cooking pot placed on three bricks is replaced by an efficient woodburning stove, GHG emissions are diminished, but the pressure on forest resources is also diminished, monetary savings are made from reduced fuelwood use, health improves through less respiratory infections and cancer, and in particular for women and children there is reduced time spent on collecting fuelwood and a lighter labour burden (ibid., 168-169).

Co-benefits reflect the idea that policy options which were not specifically designed for climate reasons – but for reasons of growth, poverty reduction, energy security etcetera – also have important mitigating effects on GHG emissions. A lot of examples have been given in previous paragraphs and in chapter 2. The idea of co-benefits is in particular important for the integration of climate concerns into development policies. Since climate is seldom a priority in developing countries, it will be necessary to look for options for integrating climate concerns in development planning, so that developing countries do not see their legitimate wish for better quality of life threatened by climate change action.

3.3.2. Policy options

The question then becomes: how can climate issues be incorporated into the broader agenda of sustainable development? Which policies simultaneously promote development and mitigate GHG emissions? In an analysis of more than hundred global futures scenarios, Morita et al. (2001) found that scenarios with decreasing GHG emissions are often characterised by: (a) low population growth, (b) rapid technological innovation and diffusion, (c) increased usage of renewable resources, (d) generally improved environmental quality and (e) increasing social and economic equity (cited in Munasinghe and Swart 2005). Such a socio-economic environment seems to be consistent with climate-friendly development. They also analysed which technologies would be robust in the sense that they would be attractive in different world views and for reaching different climate goals. Two

⁴² This is however not always true. When petrol-powered trucks are substituted for diesel-fuelled ones, the GHG emissions decrease, but emissions of nitrogenous oxides increase, causing local air pollution.

options catch the eye. First, demand reduction through efficiency increases and structural economic changes is a key robust option in any scenario, in particular in the first half of the 21st century; in the second half different energy supply options are needed for stabilisation of GHG concentrations (ibid.). Second, in all scenarios a gradual penetration of renewable energy is important, with biomass in the first half of the century, followed by large-scale introduction of other renewables later. "Options such as nuclear energy and capture and storage of carbon dioxide are only important in a few scenarios, reflecting that these options are controversial and only considered to provide important opportunities in some worldviews (e.g. both options in the technology-oriented A1T, nuclear in B2), and in some regions" (ibid., 291).

This clarifies already that the energy sector will be of crucial importance in linking development and climate. The power sector, but also the transport sector, are among the fastest growing in a lot of developing countries, and among the most critical for development. The IPCC TAR has summarised a lot of potential options for mitigating emissions in these and other sectors (such as agriculture and forestry, buildings and settlements, industry), and several researchers have further developed on these. Examples have been cited several times already: advanced energy efficient technology, renewable energy technologies, low-emissions vehicles for transport, a better modal split, urban design, biofuel production, sustainable forestry, sustainable agriculture etcetera.

While this is still a rather classical approach to climate change mitigation and development, it is very interesting to see that IPCC TAR has tried to open up the discussion and search for a broader conception of climate mitigation, intrinsically linked to sustainable development. The climate problem is viewed here as a component of a larger problem, namely the unsustainable lifestyles and patterns of production and consumption. A more sustainable development path can be achieved through two categories of interventions: decoupling economic growth from resource flows and decoupling wellbeing from economic output. Banuri et al. (2001) state that climate change mitigation is then one of the co-benefits of these decoupling processes. In what follows (3.3.2.1 and 3.3.2.2), we briefly describe these two categories as presented in Banuri et al. (2001), concentrating in particular on options relevant for developing countries. We then add some thoughts about the importance of international policies (3.3.2.3).

3.3.2.1. Decoupling growth from resource flows

The first category of climate mitigation strategies focuses on a dematerialisation of the economy, or in other words reducing the amount of resources needed per unit of economic output. For developing countries this can be a relative decoupling. Put simply, GDP grows but resource use and thus environmental pressures grows much slower. For climate change this means that GHG emissions grow at a level clearly under a business-as-usual path. For developed countries however, this should be an absolute decoupling: GDP can still grow, but resource use has to decline (or GHG emissions have to decline in absolute terms). Banuri et al. (2001) list four options:

- Policies promoting *resource-light infrastructures*: for developing countries, this option has a lot of features of what is sometimes called “leapfrogging”. Developing countries are in the midst of designing and building their physical infrastructure, and in doing that they can partly built on lessons learned and technologies in industrialised countries, with the aim of avoiding the resource-intensive infrastructural evolution which was adopted in the North. That this happens now is crucial, because once wrong capital investments have been made, developing countries might become locked in a resource-intensive development path. Examples which can lead countries on a cleaner, less costly, more equitable and less emission-intensive development path include efficient rail systems, decentralised energy production, public transport, grey-water sewage systems, surface irrigation systems, regionalised food systems, dense urban settlement clusters. Again, innovations in energy systems, such as through end-use efficiency, renewables and new-generation fossil-fuel technologies are deemed to be of particular importance.
- Policies promoting “*appropriate*” *technologies*: these are defined as technologies that build upon the indigenous knowledge and capabilities of local communities, produce locally needed materials, use natural resources in a sustainable fashion, and help to regenerate the natural resource base. Because they are also low-cost technologies, they are of particular importance for the rural and urban poor. Examples include low-cost housing using local materials, small hydropower units, low-input organic agriculture, local non-grid power stations, biomass-based small industries. Banuri et al. explicitly state that this approach will have far greater results when linked to intermediate performance levels (see under 3.3.2.2).
- Policies for *full-cost pricing*: economic restructuring and in particular energy-pricing reforms are often necessary for the success of environmental policies, in this case for reducing GHG emissions. The elimination of environmentally counterproductive subsidies is an option, making energy prices more realistic and requiring consumers to pay, or shifting the tax base gradually from labour to natural resources in a revenue-neutral manner.
- Policies promoting *eco-efficient production systems*: this seems in particular, but not exclusively, suited for developed countries, with e.g. industrial ecology, a shift from products to services, eco-efficient consumption and eco-efficient innovation

3.3.2.2. Decoupling wellbeing from production

In particular in developed countries, the strategy of dematerialisation may not be enough to lead to absolute decreases in resource use and environmental pressure, the more so because under conditions of permanent economic growth (defined in the traditional sense of GDP growth), the gains from eco-efficiency will be eroded by growth in volume. However, when wellbeing can be decoupled from economic output, this opens great potential to reduce resource use and GHG emissions. According to Banuri et al. (2001), for developing countries this kind of decoupling may start from the insight that non-monetary assets (in terms of natural resources and community networks) need to be protected and enhanced to improve the livelihoods of the poorer and less powerful sections of society. The options described should be viewed as part of long-term social learning processes, since the

conditions for their public acceptance are not often present at the requisite large scale. Four tracks are described by Banuri et al.:

- *Intermediate performance levels*: performance of technologies can vary in dimensions such as level of power, speed, availability of service, yield, labour intensity. It is usually taken for granted that performance will and should increase. Banuri et al. suggest however thinking about intermediate performance levels, i.e. deliberately designing technologies with levels of performance that lie below the maximum feasible. Examples are cars and trains with lower top speeds, but other fields of application could be construction, ventilation, refrigeration, crop cultivation, energy delivery systems. Central is the idea that in a non-carbon-based society, the performance level desired from technologies seems to be a critical factor for them to be technically and economically viable.
- *Regionalisation*: a low-input society probably needs a great reliance on regional markets using regional sources to avoid long-distance transportation (co-existing alongside of global markets relying on global sourcing). Furthermore, solar power and biomass-centred technologies may be best developed in a decentralised fashion. While a resource-light economy will in part be a regionalised economy, care should be taken that this does not impede technology transfer.
- *Appropriate lifestyles*: meant is focusing more on quality and non-material satisfaction; in particular important of course for high-consumption societies, although without doubt also relevant for the elites in the South, and some aspects such as beef-poor diets and shifts in modal split are also relevant in the South in general.
- *Community resource rights*: since one-third of mankind derives its sustenance directly from nature, an important element of more sustainable development is ensuring the rights of communities over their own resources. Resource use by outsiders then becomes a matter of negotiation and trading on more equal terms.

3.3.2.3. Supporting international policies

When climate mitigation is framed through concepts such as “decoupling growth from resource flows” and “decoupling wellbeing from production”, then climate change considerations do not only place renewed urgency on options such as energy efficiency, renewable energy or sustainable land-use practices, but they also offer an opportunity to developing countries to revisit their development strategies from a new perspective (Beg et al., 2002). However, in a globalising world, potential policy options in countries are co-determined by global politics. In other words, international policies should help to create conditions to implement sustainable development strategies which simultaneously mitigate GHG emissions. As has already been hinted at above, this cannot be done through the UNFCCC process alone, but incentives will have to come from international fora and processes, such as those on trade and finance, development assistance, multilateral agreements and sectoral policies on energy and agriculture (Davidson et al. 2003).

While it is not extremely difficult to formulate suggestions for such international policies, it will be much more difficult to realise them. A much cited suggestion (see e.g. Beg et al 2001, Davidson et al.

2002) is improving the coherence and striving for synergies between different international fora and processes. In particular for developing countries with limited capacities for implementation, this would help in meeting the different requirements and integrating them into their development policies. Obvious candidates for integration are on the one hand integration between the different multilateral agreements (e.g. UNFCCC, Convention on Biological Diversity, Convention to Combat Desertification), and on the other hand between these MEAs and the WTO. Other suggestions include regional co-operation between countries (in e.g. the field of energy supply) or the reorientation of FDI in a climate-friendly direction.

3.4. The role of the CDM

It is obvious from the previous paragraphs that technology will have an important role in mitigating emissions in developing countries, not only technology development, but also transfer, deployment and diffusion. This in turn demands a lot of money and enough capacity to implement and maintain technologies. In this triangle of technology – finance – capacity building a lot is expected from the Clean Development Mechanism (CDM).

The CDM is a project-based mechanism with a double objective: (a) assisting non-Annex I countries in achieving sustainable development, and (b) assisting Annex I countries in achieving compliance with their quantified emission limitation and reduction commitments in a cost-effective manner. So, the benefits of CDM should not just be reductions in global GHG emissions, but the mechanism should also contribute to local and regional sustainable development in the host country. Within the UNFCCC, the CDM is currently the principal instrument to encourage climate-friendly technology and resource flows to developing countries. Thousands of pages and analyses have meanwhile been written about whether it is possible to reach these two objectives simultaneously. Undoubtedly, the most important lesson learned is that the CDM is fundamentally a market mechanism, and not a sustainable development fund. This means that it exhibits all characteristics of a market mechanism: searching for high profits and low costs, searching for short-term return on investments, searching for secure investment environments, only interested in what happens within the project boundary. Since a lot of observers expected otherwise, the CDM has received a lot of criticism.

First, CDM projects are very unevenly distributed. Mid-September 2006, 266 projects were registered, mainly from Asia and the Pacific (148) and from Latin America and the Caribbean (141). Africa had only 5 projects registered. The reason is simple: the African market is not attractive for investors in CDM projects, because there are neither enough potential projects with large returns on investment, nor a stable environment for investments. But even within the regions, only 9 countries make up for 82% of registered projects: India (31%), Brazil (22%), Mexico (7%), China (6%), Chili, Honduras, Malaysia, Argentina, Republic of Korea.

Second, the Certified Emission Reductions (CERs) resulting from these projects are coming overwhelmingly from projects with little or no sustainable development benefits. The main projects are

projects which deliver large volumes of cheap credits. They are generated through a small extra investment in often already existing facilities and reduce emissions of a waste stream of GHG like hydrofluorocarbons (HFC-23), methane (CH₄) or nitrous oxide (N₂O). The most notorious example is HFC-23 which has a global warming potential of 11.700, which means that for each tonne of HFC-23 removed about 11.700 carbon credits are created. The revenues from these projects can pay off the initial investment in less than a year (Pearson 2004), but the reduction of GHG emissions has no side-benefits for the local communities or economy. This contrasts sharply with renewable energy projects, which have a lot of other benefits, but which ask more investments and deliver a lot less credits (1 ton of carbon saved, equals 1000 credits). The same kind of problem may surface with the carbon capture and storage (CCS) technology, which is currently being discussed as a potential candidate for CDM projects. Research for South Africa teaches that apart from mitigation of GHGs, CCS brings hardly any sustainable development benefits for South Africa.

While the previous points are formulated as criticisms, one might also argue that the CDM works perfectly, because as a market mechanism it seems able to find the most cost-effective emissions reductions. However, when the aim of such a mechanism is meant to be assistance to developing countries in leapfrogging resource- and emission-intensive development, then the CDM obviously fails. The criticisms have in turn lead to a lot of proposals for reforming and strengthening the working of CDM.

One option is to work with criteria and quality standards for projects, such as the Gold Standard, promoted by WWF, which is designed for the promotion of high quality renewable energy projects and end-use energy efficiency projects. While this may stimulate the creation of a small branch of quality projects, it will never be able to stop the normal market practice of seeking the most profitable investment. Besides, it is the host country which has the full freedom in determining what is meant by contributing to sustainable development.

Probably the option which is being discussed most is the opening up of CDM from project-based to sector-, programme- or policy-based⁴³. The reasons are twofold. Such an extension would allow for much greater emission reductions and thus more credits. But it also counters the criticism that a structural reform of developing countries cannot be done on a project-by-project base, and instead demands a broader approach (also in sectors in which CDM currently is not present, such as the transport sector). Isolated projects fall short of decarbonising the national economies of developing countries, but a sectoral CDM would enact policies to make relevant sectors (energy, industrial sectors such as the cement sector, forestry) less carbon intensive over time, thus mainstreaming climate considerations into the economic growth model (Figueres 2005). "It is important to underscore that in S-CDM *the policy is the project*, and the various emission reduction actions that are implemented to comply with the policy do not constitute individual project activities in and of themselves (...) The S-CDM cannot be restricted to policies motivated by climate protection goals, as that would severely impede the mainstreaming of climate considerations into economic development patterns" (ibid., 11).

Although the discussion on new forms of CDM is still in its first phase, it seems as if several problems associated with the present form of CDM remain. For one thing, there is no reason why the

⁴³ The distinction between these terms is seldom clear.

geographical distribution of CDM would drastically change. More importantly, there is an enormous problem of defining additionality. According to the Kyoto Protocol, CDM project activities may only count emission reductions that are “additional to what otherwise would have occurred in the absence of the certified project activity”. This additionality clause has to ensure that business-as-usual projects do not receive CDM credits. How the clause should be interpreted and calculated is a topic of hot debate. Sectoral CDM will not make the discussion easier. Theoretically, the baseline against which GHG emissions have to be measured, is the emission level of the sector prior to, or in the absence of, the enactment of policy (ibid.). Heller and Shukla (2005) remark however that in political economies going through fundamental reforms, such as is happening in developing countries, baselines are in flux, contingent on the direction and intensity of reform processes. In such circumstances, there will be unending disputes about what is and what is not additional. “The problem, which development and climate highlights throughout its agenda, is what business-as-usual means in setting carbon baselines in developing worlds where multiple development trajectories are in play”. The question of what additionality means will get “lost in the political dimensions of what constitutes business as usual” (ibid., 57). This in turn creates a shaky environment for investors.

These and other doubts probably explain why in the literature on climate and development CDM does not play a prominent role. The way it functions now – and even in the formulation of sectoral CDM – it is doubtful whether CDM can have much influence on the mainstreaming of climate concerns in normal development policies, and thus whether it can have important impact on the triangle technology – finance – capacity building. In the view of authors such as Heller and Shukla, mainstreaming should focus on changing political and institutional barriers, in that way creating a framework that will appeal to, and be taken up by, existing business or political organisations. Mainstreaming should also assist in the forging of coalitions between mainstream public agencies and private actors. Only these kind of institutions have enough financial and human resources and organisational capacities to support an innovative agenda (ibid., 44-45).

3.5. Critical reflections: the multiple faces of development

The words ‘development’ and ‘sustainable development’ are used hundreds of times in these pages, as well as in the literature on the theme of climate and development. It is remarkable, however, that in this whole discourse the words ‘development’ or ‘sustainable development’ are hardly ever questioned. The usual approach is just to state that both can have numerous, sometimes conflicting, interpretations. Bradley et al. (2005) remark that within the UNFCCC there has been strong resistance to any definition of sustainable development that appears to constrain developing country choices. An example is the CDM, which is supposed to promote sustainable development, but where the host country has complete freedom to declare whether a project is sustainable or not.

The kind of preparatory policy research of which this study is part, does not allow either to delve deeply into this subject. It should at least be noted however that while “development” has been an ideal for several decades in the South, according to numerous authors the results of this development

are at best very mixed: income gaps have not been reduced, the number of people living in absolute poverty remains immense high, the natural systems on which development has to rely are often threatened, the cultural identity of numerous peoples are under pressure (see e.g. the collection of essays in Sachs 1992 and Sachs 1993). While for decades, the ideal has been Western-style development, it should by now have become clear that this model cannot be followed on a global scale. The new ideal has become sustainable development, or in the stricter sense of the UNFCCC climate-friendly development. It remains to be seen however in how far the hard lessons learned in development over the last decades, will be of influence, or if the same mistakes will be made all over again.

Several examples in the realm of climate change illustrate this. Take for instance the question of hydropower, presently the most important renewable energy source in the world. Developing countries have a large untapped potential, but large dams have over the years met with strong resistance, amongst other things because of the damage to agricultural land and valuable ecosystems, and because of the evacuation of local people, 1.2 million in the case of China's Three Gorges Dam (Munasinghe and Swart 2005). While the Three Gorges Dam may have important mitigating effects on GHG emissions, the question is at what cost this comes. The same kind of questions can be asked of the biofuels program in Brazil: the labour conditions of sugar workers, the intensive agriculture practices, the threat to forests etcetera. On a different scale, questions may be asked of CDM projects. Development practitioners can testify to thousands of development projects which have failed over the last decades. It would be advisable not to repeat similar mistakes in CDM projects.

Most articles stick in their analysis to possible synergies and conflicts between climate policy and (sustainable) development policy, but seldom look at the wider question of the direction this development is taking, or who is gaining and who is losing. These kind of reflections are often absent in the climate literature on development.

The analysis in several articles authored or co-authored by Shukla (see e.g. Shukla 2002, Heller and Shukla 2003, Halsnaes and Shukla 2005) is taken further than is usually the case in climate literature. The point of departure is similar, i.e. that development will remain the primary preoccupation of developing countries in the next decades. "Since constraining growth is not an option for these policy makers [*from developing countries*, authors], the only politically viable approach to climate mitigation is to devise development strategies that can produce climate benefits ancillary to sustained economic expansion" (Heller and Shukla 2003, 112).

The question then is not just merging climate change issues with development, but this merger has to take into account circumstances and trends that currently shape development patterns and condition possibilities for the future. In different articles, the authors list several important trends and circumstances that shape current development patterns. Some of them can be considered primarily internal to developing countries, others are primarily external, still others have characteristics of both. These important trends and circumstances include (listed from more internal to more external):

- The existence of a dual economy: modern market based economic forms that are linked to global markets, exist alongside a traditional economy that is essentially rural and subsistence oriented.

- The existence of a vast informal economy with own institutions that function outside the influence of formal institutions and law
- The fact that many developing countries are going through fundamental economic transformations, i.e. almost always a transition of largely state-centred to more market-centred systems. Heller and Shukla term these countries “hybrid states”, caught between market- and state-centred regimes. “Within this fractured and evolving decision-making context, development politics continue to focus overwhelmingly on a few priority concerns. These include food security and agriculture (...) energy and transport services that underpin economic growth” (Heller and Shukla 2003, 118-119). An important observation here is that according to Heller and Shukla, in this hybrid context choices among development paths flow largely from incentives salient to particular interests, even in priority areas. Shukla (2002) also mentions the existence of subservient interests, i.e. law, economics and politics that are subservient to external interests.
- The rise and instability of private flows is a new phenomenon since the beginning of the 1990s. As official development assistance stagnated, private markets have become the primary mode for technology and resource flows, increasing from roughly 50 billion US\$ annually in the beginning of the 1990s to 300 billion US\$ annually by 2000. During this period, ODA remained around 50 billion US\$. FDI flows are by far the largest component of external financing to developing countries, with however one important remark: just 10 countries receive 70 percent of FDI. These include countries like China, India, Brazil and Mexico where reforms in the energy sector were initiated to attract foreign investors.
- These foreign investors have responded with new business strategies to mitigate risks in the evolving context in developing countries. They ally with national enterprises emerging from state control which have the experience and political assets to influence government decision-making to structure markets, financing, and contracts along favourable paths (Heller and Shukla 2003, 122). They even engage in “prospective market-making” and “invest resources in shaping future markets that will enhance their long-term returns” (ibid).
- The decline in ODA in nominal and real terms comes along new forms of assistance and new conditions attached to ODA. ODA is shifting in quality from “hard, technological, and unconstrained to soft, institutional, and selective as to both which nations (those most committed to governance reform) and which populations (those most in poverty) qualify for aid” (ibid., 124). Donors want institutional reforms, transparency, no corruption, respect for civil and political rights, an effective legal framework for competitive markets. This is accompanied by a shift to more public-private partnerships, e.g. in provision of public goods such as water, health and education.

In a sense, Shukla’s remark that “there can not be a stand-alone equity in a climate change regime, apart from the rest of the international arrangements” (Shukla 2002, 8), can be extended to the observation that there can not be a stand-alone and unproblematic integration of development in the climate change regime, apart from the rest of international arrangements and trends. It is not a simple question of integrating or merging climate and development, but also of simultaneously taking into account and influencing development shaping trends and circumstances in such a way that they are

favourable to climate-friendly and sustainable development patterns. Understanding these dynamics “is the key to crafting policies that link development and climate change” (ibid, 6). Currently, it sometimes seems that a lot of the literature on integrating climate and development uses a too simplistic notion of ‘development’ and the conditions under which it is taking shape.

It might eventually be necessary to take the analysis even a step further and describe trends and circumstances which in the past have hindered development, and which will continue shaping patterns in the future. Clear examples are the debt crisis and the policies which have been developed to tackle it – ranging from former Structural Adjustment Programs to current Poverty Reduction Strategies –, and the way countries are integrated into the world economy through processes of liberalisation, deregulation and specialisation (Muradian and Martinez-Alier 2001).

3.6. Conclusions

What this chapter has taught is that on the one hand it is necessary for developing countries to start contributing to mitigation of GHG emissions if a rise in global mean temperature of more than 2°C is to be avoided. On the other hand, evidence shows that over the last decades developing countries have already taken a lot of measures with substantive mitigating effects on their GHG emissions, i.e. their current emissions are far below what business-as-usual projections would have expected. This effect is not caused by explicit climate policies, but is a side-effect of development policies aiming at amongst other things economic growth, energy security and local environmental quality. The question now is whether developing countries will be able to capture the huge potentials for more large-scale emissions mitigation which are still present, and even boost their efforts, in that way contributing to world-wide mitigation efforts. A promising way of doing this seems to be to further integrate climate concerns in non-climate or ‘normal’ development policies. After all, GHG emissions result from almost every major societal function, in particular those that developing countries find important for their development, such as heating and lighting, transportation, agriculture, industrial activity, etcetera.

Theoretically, this approach is supported by the concept of alternative development pathways. The central argument here is that individual countries and the world as a whole do not follow predetermined development pathways, but that, depending on policies preferred, different future pathways are possible. These development pathways and the production and consumption patterns associated with them, matter as much for the emissions of greenhouse gases as do climate mitigation policies. Choosing a sustainable development path, where baseline GHG emissions are much lower than in other possible futures, will make it much easier to avoid dangerous climate change.

The IPCC TAR has advanced two broad approaches for intrinsically linking sustainable development and GHG mitigation. A more sustainable development path can be achieved through two categories of interventions: decoupling economic growth from resource flows and decoupling wellbeing from economic output. Climate change mitigation is then one of the co-benefits of these decoupling processes. For developing countries this will be a relative decoupling: GDP grows but resource use and thus environmental pressures grow much slower. For climate change this means

that GHG emissions grow at a level clearly under a business-as-usual path. On a more practical level, this implies that priority in development policies should go to amongst other things advanced energy efficient technology, renewable energy technologies, low-emissions vehicles for transport, a better modal split, urban design, biofuel production, sustainable forestry, sustainable agriculture.

It is doubtful whether in its present project form, CDM can contribute to this transition: apart from the fact that a structural reform of developing countries cannot be done on a project-by-project base, the CDM is not a sustainable development fund, but a market mechanism. It seeks fast and large returns on investment, with the result that CDM projects are very unevenly distributed geographically, and that the largest projects do not have sustainable development benefits. Even when CDM is reformed to sectoral, programme or policy CDM, it is unlikely that the geographical distribution will change substantially. Besides there are suspicions that unending disputes will surface about the meaning of additionality in turbulently developing economies. This may create an insecure environment for potential investors. Instead of focusing exclusively on CDM, mainstreaming could focus on political and institutional barriers, in that way contributing to the forging of coalitions between mainstream public agencies and private actors. Only these kind of institutions have enough financial and human resources and organisational capacities to support an innovative agenda.

Throughout the whole debate on integrating climate concerns in development policies, enough attention should be paid to discussing the agenda of development, and who are the winners and the losers in this agenda. The development discourse has in the past too often been misused – by national, foreign and international actors – for promoting policies which did not contribute to more equitable or sustainable societies. A simple merger of climate and development is an illusion. National and international development shaping trends and circumstances will have to be influenced in such a way that they are favourable to climate-friendly and sustainable development patterns. In the end, this cannot be solely addressed by the UNFCCC, but demands broadening the sustainable development agenda to institutions such as WTO, IMF and World Bank.

Chapter 4. Adapting to unavoidable climate change

It is becoming clear that regardless of how effectively precautionary measures are taken by the global community to limit anthropogenic greenhouse gas emissions, some degree of climate change is already unavoidable. Recent research suggests (see chapter 3) that a rise in global mean temperature of 2°C should be reckoned with, with associated impacts on socioeconomic and biological systems (such as health, agriculture, forests, water resources, coastal areas, habitats and species). It has also become common knowledge that the poor are likely to be hit hardest by climate change, and that capacity to respond to climate change is lowest in developing countries and amongst the poorest people in those countries. The industrialised countries, which are mostly situated in temperate climatic zones, are the largest emitters but are expected to experience relatively low damages from climate change. Although greenhouse gas emissions in poorer countries are much lower than in richer countries, the professional consensus is that tropical and subtropical developing countries will be heavily hit by climate change even if its magnitude in terms of temperature change may be relatively small. (Depledge, 2002). All this goes to say that some form of adaptation to climate change will anyway be needed, particularly in developing countries. A first paragraph in this chapter presents an overview of the key concepts and ideas that circulate in the scientific literature on adaptation. A second paragraph deals with the issues of 'mainstreaming' and equity which are at the centre of the current debate on adaptation. An introductory paragraph presents some obvious characteristics of adaptation by comparing it with mitigation on a temporal, spatial and societal scale.

4.1. Introduction: the contours of adaptation

Set out in the UNFCCC as the two response options to human-induced climate change, mitigation and adaptation represent two fundamentally different approaches. Mitigation refers to an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gasses. Adaptation refers to adjustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderate harm or exploit beneficial opportunities (IPCC, 2001a).

A first major difference between mitigation and adaptation is related to the spatial scale. It is clear that the benefits of mitigation activities are global, whilst adaptation typically takes place on the scale of an impacted system, which is regional at best, but mostly local. This implies that adaptations can be implemented on a local or regional scale, and their efficacy is less dependent on the actions of others. This also relates to the difference on societal scale, discussed below.

Secondly, adaptation differs from mitigation on a temporal scale. The benefits of mitigation activities carried out today will be evidenced in several decades because of the long residence time of greenhouse gases in the atmosphere, whereas many effects of adaptation measures should be apparent immediately or in the near future. Whereas mitigation is –by definition almost- a proactive response, there are two ways to 'time-adaptive' responses. Proactive responses involve anticipation

and planning so as to best deal with climate change impacts. Reactive responses, such as the rebuilding of infrastructure after flood damage, are taken after climate change impacts are realised but they are not necessarily ad-hoc. Uncertainty and cost considerations may sometimes justify postponing adaptive responses. Proactive and reactive responses frequently complement each other. For example, the building of additional water storage capacity complements and facilitates rationing of water. Yet proactive and reactive measures will not result in perfect adaptation: some residual impacts are inevitable. A typology of adaptive responses to climate change impacts with examples on responses in the context of agricultural productivity and food security is given in Table 4.1 (taken from Paavola and Adger, 2002).

Response	Proactive	Reactive
International	Guidelines for national adaptation strategies, support for development of new crop varieties	Food aid measures
National	Grain storage, investments and changes in agricultural policies to adapt crop mix and agricultural practices to changing climate	Changes in tariffs and fiscal policy to augment food imports; disaster relief and food aid
Local	Small-scale infrastructure investments for groundwater recharge, irrigation and flood protection, local seed banks, and coordination of adaptive responses	Collective action and reciprocity in overcoming obstacles in agricultural production and mitigating the effects of shortages of food and water
Individual	Diversification of livelihood, investment in human capital, physical capital, and alteration of agricultural practices	Migration

Table 4.1. A typology of adaptive responses in the context of agricultural productivity and food security (taken from Paavola and Adger, 2002)

On the societal scale, adaptation differs from mitigation on the actors and types of policies involved. Mitigation primarily involves the energy and transportation sectors in industrialised countries, and to an increasing extent the energy and forestry sectors in developing countries. In addition, the agricultural sector plays a role in mitigation. Compared to adaptation, the number of sectoral actors involved in mitigation is limited. Moreover, they are generally well organised, linked closely to national planning and policymaking, and used to taking medium to long-term investment decisions. In contrast, adaptation involves the interests of numerous actors: agriculture, urban planning, water supply, tourism and recreation, human, health, coastal management, etc. Whilst these sectors have in common that they are potentially impacted by climate change, decisions as to whether or not to adapt

are taken at different levels, ranging from individual farmers to national planning agencies. For these actors, climate change is typically not of immediate concern.

Another kind of difference between mitigation and adaptation is the extent to which their costs and, in particular, their benefits can be determined, compared and aggregated. Irrespective of the diversity of mitigation options, they all serve to reduce greenhouse gas emissions and in view of its global benefits it is irrelevant where in the world the mitigation takes place. Expressed as CO₂-equivalents, the emission reduction achieved can be compared with that of other mitigation options and if the implementation costs are known, the cost-effectiveness of these options can be determined and compared. The benefits of adaptation are more difficult to express in a single metric, impeding comparisons between adaptation options.

4.2. Adaptation research: an overview of concepts and ideas

Early climate change research viewed adaptation as a response mechanism, whereby changes can be made in 'practices, processes, or structures of systems to projected or actual changes in climate' (Watson, Zinyowera and Moss, 1996). Taking adaptation into account, studies aimed to compare the net costs (damages) of climate change with the costs of mitigation. Climate change impact assessment was visualised as a linear sequence of steps, beginning with the development of emission scenarios over climate change scenarios going on to determination of physical impacts and identification of adaptation options. However, due to cascading uncertainties in this approach (climate scenarios, impacts on sectors and future socio-economic conditions), it becomes partially impossible to formulate meaningful and robust climate change adaptation policies. Burton, Huq, Lim et al. (2002) refer to this scenario- and impacts driven approach, with limited consideration of present or future socio-economic conditions, as the 'first generation of adaptation research'.

4.2.1. Vulnerability as a starting point

The impacts-driven approach was followed by the emergence of vulnerability as a central concept, with a shift in emphasis from the question of gross and net impacts to questions about vulnerability, and how and where to deploy adaptation responses. These questions are important and relevant to developing countries both because they wish to reduce their vulnerability to climate change in the most effective ways, and because they are essentially in competition with each other for whatever international funds may become available to help them meet the costs of adaptation.. This 'second generation' of adaptation research considers adaptation in response to a wide variety of economic, social, political, and environmental circumstances. The point of departure is the present, in terms of vulnerability, existing adaptations to the climatic environment and the way that current policies and development practices serve to reduce or exacerbate vulnerability. Future climatic and socio-economic conditions are taken into account in assessing and prioritizing policy options, but only to set the context for future adaptations (Burton, Huq, Lim *et al.* 2002; O'Brien, Eriksen, Schjolden *et al.* 2004).

In the IPCC Third Assessment Report, *adaptation* was defined as ‘adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities’. *Vulnerability* is described as the degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including variability and extremes. Vulnerability is a function of the character, magnitude and rate of climate change, and variation to which a system is exposed, its sensitivity, and its adaptive capacity. *Adaptive capacity* is the ability of a system to adjust to climate change, including climate variability and extremes, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. *Sensitivity* is the degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. Climate-related stimuli encompass all the elements of climate change, including mean climate characteristics, climate variability, and the frequency and magnitude of extremes. The effect may be direct (such as a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (such as damages caused by an increase in the frequency of coastal flooding due to sea-level rise).

In this context, O’Brien, Eriksen, Schjolden *et al.* (2004) discuss two competing interpretations of vulnerability in the climate change literature. The first interpretation, which can be referred to as the ‘end-point’ approach and which is clearly present in the first-generation of adaptation research, views vulnerability as a residual of climate change impacts minus adaptation. In other words, the levels of vulnerability are defined by any residual consequences that remain after adaptation has taken place (Kelly and Adger, 2000). Vulnerability here summarizes the net impact of the climate problem. It allows for policy-makers to compare the net impacts of climate change with the mitigation costs. The second interpretation considers vulnerability as a starting point for analysis and is at the heart of the second generation adaptation research. Rather than being defined by future climate change scenarios and anticipated adaptations, vulnerability represents a present inability to cope with external pressure or changes, in this case changing climatic conditions. Here, vulnerability is considered a characteristic of social and ecological systems that is generated by multiple factors and processes.

Linked to the end-point and starting-point interpretations of vulnerability is the interpretation of adaptive capacity. In the end-point interpretation, adaptive capacity has been used as a measure of whether technological climate change adaptations can be successfully adopted or implemented. In the starting-point interpretation, adaptive capacity refers to the present ability to cope with and respond to stressors and secure livelihoods. Adaptive capacity in the first case refers to future adaptations and vulnerability (Brooks, 2003), while adaptive capacity in the second case pertains to present-day vulnerability (Burton *et al.*, 2002). Here, adaptation to climate change and risks takes place in an evolving social, economic, technological, biophysical, and political context that varies over time and location. This complex mix of conditions determines the capacity of systems to adapt. The main determinants of adaptive capacity are summarised in the Table 4.2 (Smit *et al.*, 2001)

<i>Economic resources</i>	Greater economic resources increase adaptive capacity Lack of financial resources limits adaptation options.
<i>Technology</i>	Lack of technology limits range of potential adaptation options. Technologically less advanced regions are less likely to develop and/or implement technological adaptation
<i>Information and skills</i>	Lack of informed, skilled, and trained personnel reduces adaptive capacity. Greater access to information increases likelihood of timely and appropriate adaptation.
<i>Infrastructure</i>	Greater variety of infrastructure can enhance adaptive capacity, since it provides more options. Characteristics and location of infrastructure also affect adaptive capacity.
<i>Institutions</i>	Well-developed social institutions help to reduce impacts of climate-related risks and, therefore, increase adaptive capacity. Policies and regulations can constrain or enhance adaptive capacity.
<i>Equity</i>	Equitable distribution of resources increases adaptive capacity. Both availability of, and entitlement to, resources are important.

Table 4.2. Determinants of adaptive capacity (taken from Smit et al., 2001)

4.2.2. Vulnerability and adaptive capacity across regions

Vulnerability, conceptualized as a starting-point, differs substantially across regions and across populations within regions. Regional differences in baseline climate and expected climate change give rise to different exposures to climate stimuli across regions. The natural and social systems of different regions have varied characteristics, resources, and institutions, and are subject to varied pressures that give rise to differences in sensitivity and adaptive capacity. From these differences emerge different key concerns for each of the major regions of the world. Even within regions however, impacts, adaptive capacity, and vulnerability will vary (IPCC, 2001a).

As already mentioned, all regions are likely to experience some adverse effects of climate change. Some regions are particularly vulnerable because of their physical exposure to climate change hazards and/or their limited adaptive capacity. Table 4.3 (below) presents a selection of adaptive capacities, vulnerabilities and key concerns of Africa, Asia, Latin-America and Small Island States. Most less-developed regions are especially vulnerable because a larger share of their economies are in climate-sensitive sectors and their adaptive capacity is low due to low levels of human, financial, and natural resources, as well as limited institutional and technological capability. For example, small

Region	Adaptive Capacity, Vulnerability and key concerns ⁴⁴
Africa	<ul style="list-style-type: none"> • Adaptive capacity of human systems in Africa is low due to lack of economic resources and technology, and vulnerability high as a result of heavy reliance on rain-fed agriculture, frequent droughts and floods, and poverty. • Grain yields are projected to decrease for many scenarios, diminishing food security, particularly in small food-importing countries (medium to high confidence). • Major rivers of Africa are highly sensitive to climate variation; average runoff and water availability would decrease in Mediterranean and southern countries of Africa (medium confidence). • Extension of ranges of infectious disease vectors would adversely affect human health in Africa (medium confidence). • Desertification would be exacerbated by reductions in average annual rainfall, runoff, and soil moisture, especially in southern, North, and West Africa (medium confidence). • Increases in droughts, floods, and other extreme events would add to stresses on water resources, food security, human health, and infrastructures, and would constrain development in Africa (high confidence). • Significant extinctions of plant and animal species are projected and would impact rural livelihoods, tourism, and genetic resources (medium confidence). • Coastal settlements in, for example, the Gulf of Guinea, Senegal, Gambia, Egypt, and along the East-Southern African coast would be adversely impacted by sea-level rise through inundation and coastal erosion (high confidence).
Asia	<ul style="list-style-type: none"> • Adaptive capacity of human systems is low and vulnerability is high in the developing countries of Asia; the developed countries of Asia are more able to adapt and less vulnerable. • Extreme events have increased in temperate and tropical Asia, including floods, droughts, forest fires, and tropical cyclones (high confidence). • Decreases in agricultural productivity and aquaculture due to thermal and water stress, sea-level rise, floods and droughts, and tropical cyclones would diminish food security in many countries of arid, tropical, and temperate Asia; agriculture would expand and increase in productivity in northern areas (medium confidence). • Runoff and water availability may decrease in arid and semi-arid Asia but increase in northern Asia (medium confidence). • Human health would be threatened by possible increased exposure to vector-borne infectious diseases and heat stress in parts of Asia (medium confidence). • Sea-level rise and an increase in the intensity of tropical cyclones would displace tens of millions of people in low-lying coastal areas of temperate and tropical Asia; increased intensity of rainfall would increase flood risks in temperate and tropical Asia (high confidence). • Climate change would increase energy demand, decrease tourism attraction, and influence transportation in some regions of Asia (medium confidence). • Climate change would exacerbate threats to biodiversity due to land-use and land-cover change and population pressure in Asia (medium confidence). Sea-level rise would put ecological security at risk, including mangroves and coral reefs (high confidence). • Poleward movement of the southern boundary of the permafrost zones of Asia would result in a change of thermokarst and thermal erosion with negative impacts on social infrastructure and industries (medium confidence).

⁴⁴ Source: IPCC (2001a). Note: The IPCC uses the following words to indicate judgmental estimates of confidence: *very high* (95% or higher), *high* (67–95%), *medium* (33–67%), *low* (5–33%), and *very low* (5% or less).

Latin America	<ul style="list-style-type: none"> • Adaptive capacity of human systems in Latin America is low, particularly with respect to extreme climate events, and vulnerability is high. • Loss and retreat of glaciers would adversely impact runoff and water supply in areas where glacier melt is an important water source (high confidence). • Floods and droughts would become more frequent with floods increasing sediment loads and degrade water quality in some areas (high confidence). • Increases in intensity of tropical cyclones would alter the risks to life, property, and ecosystems from heavy rain, flooding, storm surges, and wind damages (high confidence). • Yields of important crops are projected to decrease in many locations in Latin America, even when the effects of CO₂ are taken into account; subsistence farming in some regions of Latin America could be threatened (high confidence). • The geographical distribution of vector-borne infectious diseases would expand poleward and to higher elevations, and exposures to diseases such as malaria, dengue fever, and cholera will increase (medium confidence).
Small Island States	<ul style="list-style-type: none"> • Adaptive capacity of human systems is generally low in small island states, and vulnerability high; small island states are likely to be among the countries most seriously impacted by climate change. • The projected sea-level rise of 5 mm yr⁻¹ for the next 100 years would cause enhanced coastal erosion, loss of land and property, dislocation of people, increased risk from storm surges, reduced resilience of coastal ecosystems, saltwater intrusion into freshwater resources, and high resource costs to respond to and adapt to these changes (high confidence). • Islands with very limited water supplies are highly vulnerable to the impacts of climate change on the water balance (high confidence). • Coral reefs would be negatively affected by bleaching and by reduced calcification rates due to higher CO₂ levels (medium confidence); mangrove, sea grass bed, and other coastal ecosystems and the associated biodiversity would be adversely affected by rising temperatures and accelerated sea-level rise (medium confidence). • Declines in coastal ecosystems would negatively impact reef fish and threaten reef fisheries, those who earn their livelihoods from reef fisheries, and those who rely on the fisheries as a significant food source (medium confidence). • Limited arable land and soil salinization makes agriculture of small island states, both for domestic food production and cash crop exports, highly vulnerable to climate change (high confidence). • Tourism, an important source of income and foreign exchange for many islands, would face severe disruption from climate change and sea-level rise (high confidence).

Table 4.3. An overview of adaptive capacities, vulnerabilities and key adaptive concerns of Africa, Asia, Latin-America and Small Island States (taken from IPCC, 2001a).

island states and low-lying coastal areas are particularly vulnerable to increases in sea level and storms, and most of them have limited capabilities for adaptation. Climate change impacts in polar regions are expected to be large and rapid, including reduction in sea-ice extent and thickness and degradation of permafrost. Adverse changes in seasonal river flows, floods and droughts, food security, fisheries, health effects, and loss of biodiversity are among the major regional vulnerabilities and concerns of Africa, Latin America, and Asia where adaptation opportunities are generally low. Even in regions with higher adaptive capacity, such as North America and Australia and New Zealand, there are vulnerable communities, such as indigenous peoples, and the possibility of adaptation of

ecosystems is very limited. In Europe, vulnerability is significantly greater in the south and in the Arctic than elsewhere in the region. For a more detailed analysis, the reader is referred to IPCC, 2001a.

4.3. Central issues in the current debate on adaptation

From the above, it has become clear that many of the activities that need to be undertaken to reduce vulnerability to the adverse impacts of climate change, particularly in developing countries, relate closely to ongoing development activities. This clearly points to the need for 'mainstreaming' adaptation and development concerns which is discussed in a first paragraph below. A following paragraph will deal with equity issues in relation to adaptation in general and financing for adaptation in particular.

4.3.1. Mainstreaming

Thinking in terms of 'vulnerability' makes clear that for developing countries adaptation is closely tied to their development. Potentially adverse impacts of climate change will negatively affect development in a number of key sectors, including water resources, floods, droughts, agriculture and coastal zone management. It is increasingly recognized that to effectively support adaptation to climate change and minimize the risks associated with predicted impacts, there is a great need to better integrate adaptation considerations into the centre of decision making and policy formation (Huq et al., 2003). Hence the idea of mainstreaming. Mainstreaming refers to incorporating strategies to reduce vulnerability to climate change and variability into existing policies regarding disaster planning, food security, water resource management, health issues, sustainable livelihoods, etc. the primary objective being that adaptation becomes part of programmes that further sustainable development planning. Another commonly used term is climate proofing, i.e. the development of actions to protect infrastructure, systems and processes against climate impacts (Parry et al., 2005).

Opportunities for mainstreaming adaptation and development can be found in different sectors at several different levels, including the local, sectoral, national, regional and global level:

- **Local level.** The most severely impacted communities in developing countries will be those communities living in geographic regions most exposed to climatic impacts (e.g. flood- and drought-prone areas). As these people are generally poorer than the rest of the population within the country, they need to be targeted with specific programmes providing support for adaptation. Local strategies for preparing for and responding to the anticipated impacts of climate change can be built into municipal planning processes and community level strategies, covering areas such as risk assessment practices, community services, emergency preparedness programs, seed banks etc. (AfDB 2002) . In this context it is important to stress that adaptation to climatic variability is not something completely new for people living in (sub-) tropical regions. The importance of learning from traditional adaptation strategies has repeatedly been stressed in the adaptation debate (Wairoto, 2006; Simms and Reid, 2005).

- **Sectoral level.** Within countries, the most adversely impacted sectors include agriculture, water resource management, coastal zone management as well as disaster (e.g. floods, droughts and cyclones) management. Consideration of climate change impacts need to be built into sectoral planning processes such as infrastructure design and maintenance codes and standards (Huq and Reid, 2004).
- **National level.** Adaptation considerations can be integrated into a wide range of national policies and planning processes. Particular attention might be given to national planning and budgetary processes. An important feature is indeed the need to address existing policies and actions, which enhance (rather than reduce) vulnerabilities to climate change, and remove 'maladaptations'. By examining budgets with an eye to whether planned expenditures will increase exposure to climate change impacts, national governments can minimize their financial risk, promote macroeconomic stability, set aside sufficient funds to manage climate impacts, and provide support for adaptation activities at the local and sectoral level (AfDB et al., 2002).
- **Regional level.** Many climate change impacts will be felt acutely at the regional level in areas such as West Africa, Eastern Africa, Southern Africa and South Asia. Regional-level actions may therefore be most appropriate (e.g. for river basins or major drought prone areas such as the Sahel) although concrete strategic opportunities (i.e. policies) to integrate adaptive measures are less obvious.
- **Global level.** Key opportunities exist for integrating adaptation into international processes. For example, reaching many of the Millennium Development Goals (MDGs) may be more difficult due to adverse impacts of climate change. Considerable opportunity also lies in integrating adaptation considerations into the Country Assistance Strategies of the World Bank, the lending practices of international financial institutions and aid initiatives more broadly.

Although the rationale for mainstreaming climate and development is clear, this knowledge has thus far rarely led to the design of policies, programs or projects that bear these findings in mind. For example, current documents that guide development strategies in developing countries, such as national development plans and Poverty Reduction Strategy Papers (PRSP), pay negligible attention to climate change (Agrawala, 2004). Discussions on how this can be realised in a post-2012 climate architecture are ongoing. The five-year SBSTA programme of work on impacts, vulnerability and adaptation to climate change, agreed upon at COP 11 in Montreal, will be an important venue for furthering these efforts. This programme is intended to assist Parties in addressing methodologies, data and modelling, vulnerability assessments, adaptation planning, measures and actions, and integration into sustainable development. Up till now however, work has concentrated on gathering information from relevant sources. A more concrete starting point may be found in the National Adaptation Plans of Action (NAPA) for Least Developed Countries (LDC). The Marrakech Accords (COP 7) established a separate LDC work programme includes the preparation of NAPAs to be funded by a newly created LDC fund (see below). NAPAs open up a channel for LDCs to inform the international community of their 'immediate and urgent' adaptation needs. According to the guidelines adopted at Marrakech, NAPAs should be guided by, amongst others, the principles of sustainable

development and complementary approaches in the national development strategies of the LDCs. Countries are to recognise the local community as a main stakeholder and take into account current vulnerability and existing coping strategies at grassroots level to identify priority adaptation activities (rather than focussing on scenario based modelling in shaping long-term national policies).

4.3.2. Equity and financing

Climate change has implications for equity and justice because the impacts of climate change, and resources for addressing these impacts, are unevenly distributed. Issues of equity and justice in the context of climate change are probably far more readily argued and embraced at a country to country level relevant for mitigation action. While a great deal of effort has been spent on understanding the potential burdens of climate change mitigation on countries and economies, issues relating to equity in adaptation to climate change have been largely ignored. Poor people in developing countries are amongst the least responsible for climate change, yet they face the greatest impacts and generally have a low capacity to deal with these impacts. Because of this evident socio-economic vulnerability, Sokona and Denton (2001) argue that it is crucial to bring equity to the forefront of the climate debate if it is to remain relevant to the governments of developing world people.

All adaptation decisions (See Table 4.1, above) have justice implications, both distributive and procedural. As illustrated in Table 4.4 (Taken from Paavola and Adger (2002); see below), distributive justice focuses on the distributional consequences of environmental decisions, ranging from the uneven spatial and social impacts of climate change to the variable impacts of response strategies. Procedural justice concerns how and by whom decisions on adaptive responses are made. Adaptation plans and decisions can aggravate inequality rather than reduce it if e.g. one group is excluded from planning and decision making on adaptation. Critical issues for procedural justice include who is recognized and heard in decision-making and who controls decision-making processes at different levels.

Field of justice	Key issues
Distributive	<ul style="list-style-type: none"> • Distribution of the burden of making funds available for assisting adaptation • Distribution of assistance for adaptation • Distribution of costs and benefits of adaptive responses
Procedural	<ul style="list-style-type: none"> • Whose interests considered and how • Who can participate in and how • How much influence parties have and on what basis

Table 4.4. Key justice issues in adaptation (taken from Paavola and Adger, 2002)

Distributive and procedural justice are often intertwined in the key substantive justice issues of adaptation to climate change, which can be summarized as follows:

- *responsibility* for climate change impacts and the level and burden sharing of assistance to vulnerable countries for adaptation
- distribution of *assistance* between recipient countries and adaptation measures ('recipient side')
- *fair participation* in planning and making decisions on adaptation.

The current climate change regime does not explicitly address responsibility for climate change impacts and it remains vague regarding the extent to which developed countries should assist developing countries to adapt. Responsibility would require developed countries to compensate developing countries for the harmful impacts of anthropogenic climate change. Assistance can rather be viewed as based on the principle of common but differentiated responsibilities and respective capabilities articulated in the Framework Convention; the duty to assist comes with the capability to assist and the right to assistance is based on limited capability to deal with climate change.

The Convention does not ignore responsibility completely, however. Article 2 requires the stabilisation of greenhouse gas concentrations in the atmosphere so that dangerous anthropogenic interference with the climate system can be avoided. The article further implies that Parties to the Convention are responsible for ensuring that climate change and its impacts do not surpass the adaptive capacities of ecosystems, food production systems and economic systems. The climate change regime also creates other responsibilities regarding adaptation. The Convention's Article 4, Paragraph 1(e)–(f) commits the Parties to cooperate in adaptation planning and to incorporate climate change considerations into their economic, social and environmental policies so as to minimise adverse effects on public health, environmental quality and on mitigation and adaptation measures. Kyoto Protocol Article 3, Paragraph 14 commits Annex I countries to meet their emission reduction targets so as to minimise adverse social, environmental and economic consequences for developing countries. Kyoto Protocol Article 10, Paragraph 1(b) directs the non-Annex I parties to the Protocol to formulate, publish and regularly update national programmes for adaptation to climate change. The Article also provides that the parties should include information on these programmes into their national communications and into their other reports.

The climate change regime makes more detailed provisions on assistance. Convention Article 3, Paragraph 2 directs developed countries to consider the specific needs and special circumstances of particularly vulnerable developing countries and formulates a duty for all parties to take precautionary measures that anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects. Paragraph 3 provides that these responses should be cost-effective to ensure global benefits at the lowest possible cost. This principle is – contrary to mitigation – however not applicable to adaptive actions as these generate mainly local benefits (See above for the major differences between mitigation and adaptation). The most important provisions regarding assistance are in Convention Article 4. Paragraph 4 commits developed countries to assist particularly vulnerable developing countries in adaptation. Paragraph 7 underlines that the degree to which developed countries fulfil these financial commitments will determine how developing countries can fulfil their obligations, recognising that the eradication of poverty and social and economic development are their primary concerns. Paragraph 8 demands attention to the specific needs and concerns of developing countries,

listing small island states, countries with low-lying coasts, arid countries and countries dependent on fossil fuels as requiring special attention in matters of financial assistance, insurance and the transfer of technology. Paragraph 9 presents a similar requirement for acknowledging the special needs and circumstances of the least developed countries.

The duty to provide assistance is expressed clearly in general terms but so far the climate change regime has failed to fully operationalise assistance despite having taken some steps in this direction (See also chapter 1: 'Equity provisions in the current climate regime'). Kyoto Protocol Article 12, Paragraph 8 provides that a share of the proceeds of CDM projects should be used to assist particularly vulnerable developing countries to meet the costs of adaptation. COP6 created an Adaptation Fund under the Kyoto Protocol for assisting adaptation projects in developing countries and provided that it is to receive 2% of the proceeds of CDM projects, in addition to funds made available by the Annex I countries. COP6 and COP7 also established the Special Climate Change Fund and the Least Developed Countries Fund under the Convention. The former is to support adaptation activities and capacity building and the latter the work programme of the least developed countries under the Convention, including the preparation of National Adaptation Programmes of Action (NAPAs). The two funds will be based on funding made available by the Annex I countries and they will be managed by the Global Environmental Facility (GEF). The current climate regime fails to determine how much assistance ought to be made available by developed countries and how they should share the burden of assistance. Currently contributions are entirely voluntary and, as a result, funds for assistance are negligible (See chapter 1: 'Equity provisions in the current climate regime'). Firm and regular financing under the Convention is needed to ensure the viability of these funds and to provide developing countries with a predictable source of adaptation funding. Developing countries therefore plea for mandatory contributions based on equity criteria such as responsibility (historical emissions) or capacity (ability to pay) in order to generate firm and regular financial resources at the high levels needed. Besides, financing could also be provided through the establishment of agreed upon levies (such as proposed by Ott and Sachs, 2000) or be leveraged from various insurance and risk transfer instruments. The latter serve to reduce the financial risks associated with climate-related extreme weather events, and increase adaptive capacity by creating systems that allow for quick access to capital for reconstruction following a disaster.

The regime also leaves it unclear how assistance ought to be distributed between countries and adaptation measures. The allocation of assistance between adaptation measures is not completely omitted: Kyoto Protocol Article 10, Paragraph 1(b) provides that developing countries should formulate, publish and regularly update national programmes for adaptation to climate change. The process to be used for generating these plans was specified by COP7 in the guidelines for the preparation of NAPAs. The guidelines require multidisciplinary and extensive public participation and consultation in the preparation of the NAPAs. The concern that underlies these provisions is that non-transparent and unaccountable governments should not be able to dictate the content of the national adaptation programmes of action: a broad range of affected groups should have a say to their content and to make their interest to count. However, it remains to be seen to what extent aims of the

guidelines will be achieved and there still is not a solution for generating assistance priorities across countries.

Besides the NAPA guidelines referring to public participation and consultation, the climate regime has acknowledged also other issues of procedural justice relevant to adaptation. The emphasis on public participation and consultation is also linked to capacity building (see Decision 2/CP.7.) by providing both a rationale for capacity building and opportunities to exercise capacity. Another instance of concerns for procedural justice is to be found from a motion to improve the participation of women in the representation of parties in bodies established under the Convention and the Kyoto Protocol (Decision 36/CP.7.). In particular, the establishment of a least developed countries expert group (Decision 29/CP.7.) is of importance for adaptation: it gives these countries more voice in planning for adaptation to climate change and in the identification and prioritisation of adaptation measures. Many adaptation measures will take place at the local level and all of them will have local impacts. There thus has to be a way to elicit information on local interests and circumstances as well as to enable meaningful participation of representatives of the local level in internationally coordinated adaptation measures. Existing provisions create a basis for recognising and hearing developing country and local voices but it remains to be seen how consequential they prove to be.

4.4. Conclusion

Regardless of how effectively precautionary measures are taken by the global community to limit anthropogenic greenhouse gas emissions, some degree of climate change is already unavoidable. Recent research suggests that a rise in global mean temperature of 2°C should be reckoned with, with associated impacts on socioeconomic and biological systems (such as health, agriculture and food security, forests, water resources, coastal areas, habitats and species, physical infrastructure). It has also become common knowledge that the poor are likely to be hit hardest by climate change, and that capacity to respond to climate change is lowest in developing countries and amongst the poorest people in those countries. Adaptation to climate change has thus become an important part of international and national climate policy for developing countries.

In the “first generation” of adaptation research, adaptation was seen as the last step in a linear sequence of steps, beginning with the development of emission scenarios, over climate change scenarios, and going on to the determination of physical impacts and identification of adaptation options. In the “second generation” of adaptation research, vulnerability is taken as a starting point. Vulnerability is described as the degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including variability and extremes. Rather than being defined by future climate change scenarios and anticipated adaptations, vulnerability represents a *present* inability to cope with external pressure or changes, and it is determined by the characteristics of social and ecological systems in a country. Vulnerability assessments can be used to identify the adaptive capacity of a country, which in turn provides insights into the opportunities and constraints to implementing specific adaptation policies. In contrast to the “first generation” adaptation studies the type of policy measures that emerge from a vulnerability approach, are social rather than technical in

nature, and include poverty reduction, diversification of livelihoods, protection of common property resources, and strengthening of collective action. Such measures strengthen the ability of individual people and society to respond to stressors and secure livelihoods under present conditions, which should then increase the capacity to adapt to changing conditions in the future. These considerations clearly point to the need for mainstreaming adaptation concerns in development programs and plans, because a lot of the activities that have to be undertaken to reduce vulnerability to the adverse impacts of climate change, particularly in developing countries, are in fact part of what can be considered “normal” (sustainable) development policies.

Mainstreaming refers to incorporating strategies to reduce vulnerability to climate change and variability into existing policies regarding disaster planning, food security, water resource management, health issues, sustainable livelihoods, education etcetera, the primary objective being that adaptation becomes part of programmes that further sustainable development planning. But although the rationale for mainstreaming climate and development is clear, this knowledge has thus far rarely led to the design of policies, programs or projects that bear these findings in mind. Documents that have important impact on development strategies in developing countries, such as national development plans and Poverty Reduction Strategy Papers (PRSP), pay negligible attention to climate change.

Even under the UNFCCC, and although adaptation is referred to in several articles, it was not until the adoption of the Marrakesh Accords in 2007 that adaptation began to be more widely seen as a prominent area for action. Discussions on how adaptation should be incorporated in a post-2012 climate architecture have only just started. Important input may come from the five-year SBSTA programme of work on impacts, vulnerability and adaptation to climate change, agreed upon at COP 11 in Montreal. This programme is intended to assist Parties in addressing methodologies, data and modelling, vulnerability assessments, adaptation planning, measures and actions, and integration into sustainable development. Until now however, work has concentrated on gathering information from relevant sources. The most concrete examples of what adaptation can mean, is currently to be found in the National Adaptation Plans of Action (NAPAs) for Least Developed Countries.

Mainstreaming adaptation and executing specific adaptation plans requires adequate funding. The current climate regime fails to determine how much assistance ought to be made available by developed countries and how they should share the burden of assistance. Currently contributions are entirely voluntary and, as a result, funds for assistance are negligible. Developing countries therefore plea for mandatory contributions based on equity criteria such as responsibility (historical emissions) or capacity (ability to pay) in order to generate firm and regular financial resources at the high levels needed.

Chapter 5. Developing countries and the architecture of the post 2012 regime

5.1. Introduction: post-2012 climate architectures

Recently, academic experts, stakeholders, NGO's and governments have been proposing a wide range of alternative options for advancing the international climate change effort beyond 2012. Such proposals comprise more than emission targets and an approach on how to allocate future greenhouse gas emission rights across countries. Although they are a central feature of a future climate regime, emission targets are but one part of a coherent climate protection architecture. As with the design and construction of a house, a climate protection treaty has its own set of architectural elements that must meet the needs of its stakeholders. Which elements to include and what form these different elements should take, all this depends on the concerns and interests of the parties.

Any proposal for advancing the international climate effort obviously has to be situated against the backdrop of the UNFCCC and the Kyoto-protocol. The 1992 FCCC, ratified by 189 nations, establishes the (formal) basic structure of the existing climate change regime. This includes: the ultimate objective of stabilizing GHG concentrations at safe levels; general principles such as precaution, cost-effectiveness, equity and sustainable development, obligations to report on GHG emissions and national measures to combat climate change and commitments for assistance and technology transfer to developing countries. Most probably, and perhaps most likely, a future climate regime will be based on the general basis of the Framework Convention; the majority of the existing proposals do appear to presume that international climate negotiations should continue to be conducted among governments on a global basis, with the goal of developing a single, comprehensive regime. Moreover, it is also presumed that the negotiations will continue to be conducted under the auspices of the UNFCCC, and many focus on elaborating and further developing the Kyoto Protocol.

There are other non UNFCCC based strategies, such as the 'Orchestra of Treaties' proposal (Bodansky, 2004) which envisions a variety of activities (such as e.g. an emissions market group, a zero emissions technology treaty and a climate wise development treaty) undertaken outside the UNFCCC by like-minded states ('coalition of the willing')⁴⁵. The 'Asia-Pacific Partnership for Clean Development and Climate' announced in July 2005 by the USA together with five countries of the Asian-Pacific Region – namely Australia, India, Japan, China and South Korea- can be situated under this category. In this paper however, focus will be on proposals for architectures that are situated within the UNFCCC framework. Within the bunch of proposals that build on the general framework (objectives, principles,...) of the UNFCCC, one can distinguish between those that build on the basic architecture of Kyoto and others departing by varying degrees from the existing Kyoto architecture, e.g. by articulating a different type of commitment (e.g. policies and measures to be adopted rather

⁴⁵ Other non UNFCCC based proposals include the 'Portfolio Approach', the 'Converging Markets Approach' and the 'Parallel Climate Policy Approach' (see e.g. Bodansky (2004)).

than quantitative absolute emission targets to be met) or a different rule for differentiating commitments between member parties. This distinction between “Continuing-Kyoto” and other UNFCCC based approaches also came to the surface during the COP/MOP1 in Montreal. There, discussion on the architecture of specific pathways was characterized by uncertainties about whether Kyoto will remain the central mechanism, or just one approach of many under the umbrella of the UNFCCC. In the three-track system on the future of the climate regime which has been adopted at the Montreal meeting, the two first tracks are developed under the Kyoto Protocol, the third one under the UNFCCC:

1. The Meeting agreed to convene an ad hoc open-ended working group to consider the future of the regime under the Kyoto Protocol (Art.3.9), which refers to another commitment period for industrialized countries parties to the Protocol;
2. The meeting also called parties to “submit their views” on a review of the Kyoto Protocol, under Art. 9. This opens the door for discussions on possible emissions reductions for developing countries;
3. Finally, the meeting also agreed to launch a “dialogue on the future regime” under UNFCCC: this initiative will allow the discussion on future global action on climate change with the UNFCCC parties including those that are not parties to the Kyoto Protocol.

By advocating for such a process to consider the future under both the Kyoto Protocol and the UNFCCC, COP President Dion sought an outcome that maintained the momentum and integrity of the Kyoto Protocol while also engaging the US and other countries that have not ratified the Protocol.

In this chapter, an effort is done to deconstruct the different policy proposals for a future climate architecture in main constituent elements or ‘building blocks’. Elements considered here include provisions for controlling greenhouse gas emissions such as a global environmental objective and concrete targets, a differentiation framework for burden sharing, market mechanisms, and provisions for adaptation, technology transfer and avoiding deforestation. Each building block is briefly described and main approaches for operationalisation are discussed. The motivation for such a deconstruction exercise is mainly threefold. Firstly, we want to make clear what the whole post-Kyoto debate is about: what are the key-issues at stake and what are approaches that are being proposed to tackle these issues. Secondly and most relevant for this specific research project, we want to assess individual building blocks and accompanying proposals along three axes of analysis: environment, economy and development, and equity. Analysis along these axes will bring key concerns and interests of different parties and in particular developing countries to the forefront. Finally, breaking policy proposals into building blocks facilitates the recombination of aspects of proposals into new policy architectures and thus adds to the creativity needed to further develop a balanced climate change policy.

In a first paragraph, the three axes analysis framework is introduced. Next, the different building blocks are presented and analysed along these three axes. Finally, some general conclusions are formulated.

5.2. A three axis analysis framework: environment, economy and development and equity

We propose a three axis framework for analysing possible building blocks for a post-2012 climate regime. As possible approaches are always proposed by somebody or some entity they will always be based on somebody's or some entity's concerns and/or interests. Major concerns and interests in the climate change arena can be clustered under three categories: environment, economy and development, and equity. As a basis for assessing the different approaches, it might therefore be instructive to distinguish the following axes of analysis:

1. Environment

As a point of departure, it is logical to expect any measures to combat climate change to be 'environmentally effective'. Environmental effectiveness, measured in terms of the ability of a policy to stabilise atmospheric concentrations of greenhouse gasses, is the overriding priority of international climate policy. The Third Assessment Report of the IPCC reports a high level of scientific understanding (and consensus) of the positive relation between human activity, levels of greenhouse gases in the atmosphere and climate change. Given this analysis, it is clear that policy makers need to take a strong stance on emissions reductions if they are serious about protecting the world from the adverse effects of climate change. Stringent emission targets, international participation and encouragement of early action are all proposed under the rationale for environmental effectiveness.

2. Economy and development

The UN framework convention on climate change states that the parties "should co-operate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all parties, particularly developing country parties, thus, enabling them better to address the problems of climate change". It is clear that economic growth and sustainable development issues are critical concerns of all countries but, in particular, of developing countries. While economic concerns in developed countries relate more to pure economic growth issues and the perceived costs of climate policy to the economy, mainstreaming climate action with overriding priorities as economic and social development and poverty eradication is key to developing countries

3. Equity

The issue of equity is a key feature of the UNFCCC. Most significantly, it identifies "common but differentiated responsibilities" and commits developed countries to take the lead. Many different equity notions or claims have been put forward in the climate debate. Most can be encompassed within what are here described as six dimensions of equity. Not all are universally held principles, but each has sufficiently broad appeal to have attained legitimacy in the climate change arena:

- **Equal entitlements:** as it can be argued that the atmosphere is a global resource, every human being should have an equal entitlement to greenhouse gas emissions.

- **Need:** this criterion adheres to the principle that everyone deserves the right to emit a minimum quantity of greenhouse gases that allows them to meet their basic human needs. It implies that any international climate agreement should help, or at the very least not hinder, a person's ability to secure a decent standard of living.
- **Responsibility:** this notion relates to the polluter pays principle, whereby the party responsible for causing a problem is expected to bear the cost of resolving it.
- **Opportunity:** some countries, such as those with energy inefficient economies (i.e. high carbon intensity), are better placed than others to make low-cost emissions reductions, and it is argued that a fair agreement should take account of this.
- **Capacity:** This relates to the idea of ability to pay for climate abatement, i.e. the most able should contribute the most
- **Comparability of effort:** Ashton and Wang (Ashton and Wang, 2003) claim that any agreement secured by a party must not only be formulated fairly and deemed acceptable in its own right, but must also be seen to be just in relation to the deals secured by others.

Together, Ashton and Wang argue, these six dimensions define a notional 'equity space'. Any climate policy proposal can be uniquely located in this space according to its projection in each dimension. Stakeholders in the climate change arena will champion different, sometimes competing, equity 'dimensions', depending on their self-perceived interests and concerns. The 'responsibility' dimension, for instance, most handled by developing countries, would suggest that those nations that are most responsible for the accumulation of greenhouse gasses in the atmosphere should take on the greatest burden for containing the problem whereas the 'opportunity' dimension would place a great burden on developing countries as the cheapest abatement opportunities are believed to be found there.

The three axes described above are very much interlinked. For example, developing countries have always rejected fixed binding targets on the ground of equity (mainly based on the historical responsibility dimension of equity), but without their engagement climate policy will clearly be less cost-effective and environmentally effective. On the other hand, if developing countries were to take on such targets, the need to fully encompass their equity and development concerns could yield a target with very limited environmental benefit. Similar to the 'equity space' concept, the three axes proposed here (environment, economy and development, and equity) can be seen as constructing a notional 'negotiation space'. Every climate policy proposal has a unique 'qualitatively determined' location in this space; the location being defined by the way how it deals with the three categories of concern.

	Environment	Economy and development	Equity
Environmental objective	A concrete long-term target should guide effective action	Climate change threatens development (DC) Long-term target incompatible with economic uncertainty (DedC)	Towards future generations
Commitments	Absolute, binding targets guarantee environmental outcome	Absolute targets cap growth; SD-PAMs may be viable (DC) Flexible targets decrease cost-uncertainty (DedC)	Different types of commitments for different parties can add to equity
Differentiation framework	Principle-based (top-down) scheme guarantees environmental outcome	Some emission space for growth needed (DC) Some degree of grandfathering to get out of fossil lock-in (DedC)	Equity principles as a basis for differentiation (also for procedural equity)
Market based mechanisms	'Pollution rights' Hot air undermines environmental effectiveness Environmental additionality	CDM as a development opportunity (DC) Enables cost-effective action (DedC)	Responsibility dimension pushes developed countries to domestic action
Adaptation policy	(Endangered ecosystems)	Mainstreaming with development goals (DC)	Who will bear the costs (responsibility?)
Technology policy	Zero carbon technologies needed in long term	Technology development and deployment (DedC) Leapfrogging via technology transfer (DC)	Who will bear the investments (capability?)
Avoiding deforestation	Deforestation responsible for 20-25% of CO ₂ emissions Environmental additionality	Generation of carbon credits (DC)	Fair distribution of benefits and responsibilities

Table 5.1. The three axes analysis framework. Throughout the discussion of the different building blocks this matrix is filled with elements resulting from an analysis along the three axes of concern: environment, economy and development, and equity. Here, DC and DedC stand for Developing and Developed Countries, respectively.

5.3. Seven building blocks for a climate architecture

In the following sections, seven possible building blocks for a future climate architecture are discussed. Each building block is briefly introduced together with main options for operationalisation. Following the three axes framework introduced above, we will try to make clear how differing concerns in the areas of environment, economy and development, and equity are at stake in the different blocks. The basic elements of this analysis are summarised in a matrix (see Table 5.1) with the building blocks as rows and the axis of concern as columns. Throughout the discussion that follows, elements will be added to this matrix.

It should also be mentioned here that, while some blocks, e.g. those dealing with differentiation of commitments and market mechanisms, have been the object of extensive political discussion, other blocks on e.g. adaptation, technology and avoiding deforestation are only emerging in the climate arena resulting in less concrete proposals and approaches for the post 2012 period.

5.3.1. Environmental objective

A crucial element that is often not mentioned is the concept of a global environmental objective. Any proposal for a future climate architecture is –explicitly or implicitly- aimed at achieving a certain environmental objective. The main question at stake is whether the international climate policy should a priori aim for a long-term stabilization level and, if so, which level. Options range from trying to reach consensus on specific long-term atmospheric concentration targets (e.g. 450 ppm; 2°C) to simply ignoring this contentious issue and focusing instead on what can be done in the nearer term.

The guiding objective for future negotiations is found in Article 2 of the UNFCCC Framework Convention⁴⁶. Making this environmental objective more explicit is sometimes considered a crucial element in a viable climate architecture. A more concrete long-term objective might help shape more effective near-term actions in a way that is consistent with a variety of future atmospheric stabilisation options. In order to do this, the international community needs to define the level of climate change that would constitute “dangerous” interference. Taking the UNFCCC objective phrasing as a starting point implies that questions pertaining to the level and timing of mitigation commitments derive from a common concern in the international community about the potential damages of climate change and the need to make timely progress in abating potentially ‘dangerous’ climate change. By referring to potential threats to food security, ecosystems and sustainable development as constituting dangerous climate change, the UNFCCC phrasing indicates that “dangerous anthropogenic interference” may be characterized in terms of the consequences or impacts of climate change outcomes. These, in turn, can be related⁴⁶ to the levels and rates of change of climate parameters. These parameters will, in turn, be determined by the evolution of emissions and consequent atmospheric greenhouse gas concentrations.

Evaluating the consequences of climate change outcomes to determine those that may be considered “dangerous” is a complex undertaking, involving substantial uncertainties as well as value judgements. (Hare, 2003; Ott et al., 2004). For a full comprehension of the uncertainties involved, it is illustrative to have a closer look at the cause-effect chain from greenhouse gasses to changes in climate and impacts. Roughly six steps can be distinguished:

1. Human activities result in GHG emissions, precursors and aerosols
2. These change the concentration of these and other gases in the atmosphere.
3. Changed concentrations influence radiative forcing, the amount of heat radiation that is reflected by the atmosphere back to the surface of the earth.
4. Changed radiative forcing influences surface temperature.
5. The absolute change in temperature, as well as the rate of its change, influences the sea level and other parameters such as precipitation and related damages.

In addition, several feedbacks exist, e.g. changes in climate may change vegetation cover, influencing the build-up of concentrations in the atmosphere. Obviously, policy decisions are made difficult by

⁴⁶ “to achieve ... 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”

cascading uncertainty and delays in the cause–effect chain due to inertia in the systems involved. Uncertainty cascades throughout this chain effect, as the uncertainty range at the top of the chain grows in significance after moving through the intermediate drivers and indicators of change. The broadest bands of uncertainty are found at the bottom of the chain.

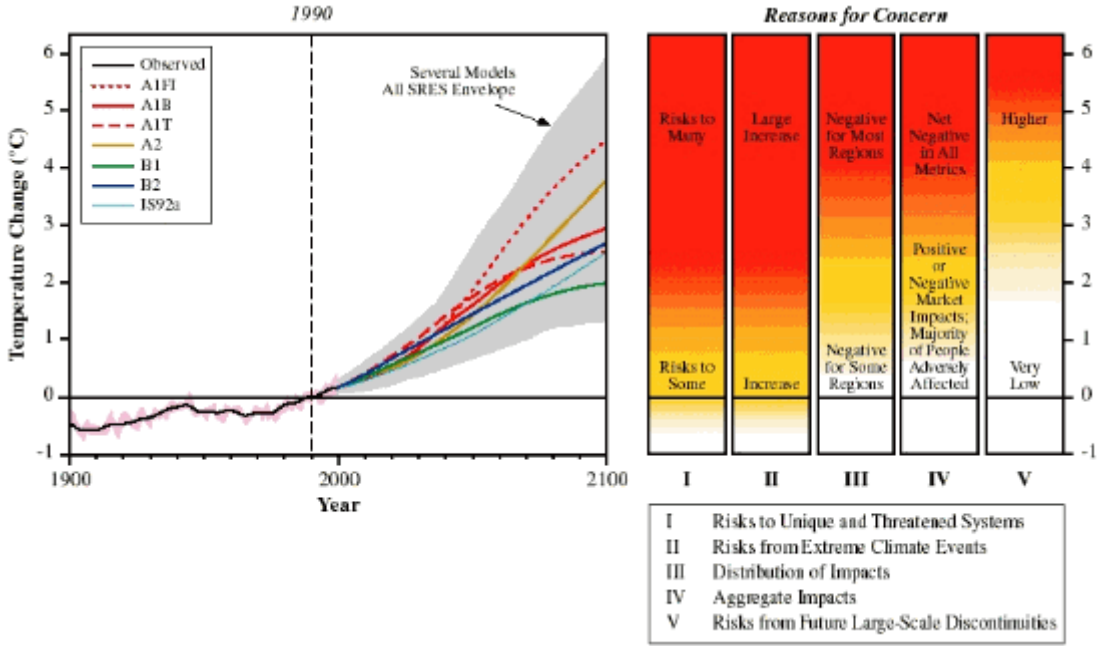
The IPCC Third Assessment Report (TAR) laid out a way to begin to structure thinking about the risks of climate change, referring to five areas of concern. It gives a qualitative description of the impacts expected from climate change at different levels of global mean temperature increase. (based on Corfee-Morlot and Höhne, 2003) (See Figure below):

- Risk of large scale singularities: Such events are estimated to be low probability of occurring during this century with a higher probability over longer time frames or with rapid rates of human-induced radiative forcing. One problem with estimating this type of risk is the huge uncertainty surrounding what conditions may trigger such an event
- Aggregate impacts: This looks across all types of sectoral and regional impacts damages to aggregate global impacts. A limited number of economic studies provide aggregate global estimates in monetary terms (Nordhaus and Boyer, 2000; Tol et al., 2000). A number of other recent studies use alternative numeraires, such as numbers of people affected, by sector impact at different levels of stabilisation or global mean temperature change (Parry et al., 2001; Arnell et al., 2002). Market impacts receive more comprehensive and careful treatment (compared to non-market impacts). Beyond problems of comprehensiveness and consistency (e.g. in treatment of adaptation), problems surrounding aggregation also need to be overcome to provide transparency about moral judgements embedded in whatever approach is chosen. Is one person's displacement in Bangladesh due to flooding equivalent to another person's displacement due to flooding in Fiji or in the southern United States? If not how should we compare these losses?
- Distribution of impacts: A given change in concentrations or in global mean temperature will result in widely varying regional temperature and precipitation patterns. Some regions will be particularly vulnerable to even low levels of climate change in part because they are extremely poor and have less capacity to adapt to change in general. Thus, differences in vulnerability may result from geo-physical factors, such as heavily populated low-lying coastal areas in a region or from socio-economic factors, such as poverty levels and inadequate capacity to cope with change.
- Risks of extreme weather events: This describes the risk of increased variance in climate change over the long term, including more hot days and fewer cold/frost days over nearly all land areas, and more intense precipitation events over many areas.
- Risks to unique and threatened systems: Significant risk to ecosystems exists at even small levels of changes in global mean temperature, and may affect coral reefs, glaciers and mangroves, as well as indigenous people's livelihoods in some parts of the world. These disruptions occur even at relatively low levels and rates of global mean temperature change.

It may be clear that the description of these reasons for concern, which involve only the last step in the above-mentioned cause-effect chain, are subject to a lot of uncertainties and build on value-judgements. It is therefore no surprise that the IPCC has to date left discussion of the issue to the

political rather than the scientific arena; the third assessment report states that, ‘Given the large uncertainties that characterize each component of the climate protection problem, it is impossible to establish a globally acceptable level of greenhouse gas concentrations today’ (Toth and Mwandiyosa, 2001).

The discussion of danger clearly goes broader than a purely natural science assessment of risks. Determining how to measure impacts and weighing the relative importance of various types of impacts are quite properly matters of judgment that draw upon values beyond the context of natural science (Patwardhan et al., 2003). For example, deciding what constitutes “dangerous” climate change may involve formal or informal assessments of risk that include judgments on whether to employ monetary or other measures of impacts, and determining which aggregations of people or natural systems ought to be of concern, when to use quantitative versus qualitative approaches, and what outcomes are unacceptable. It has e.g. been suggested (Oppenheimer, 2005) that the disintegration of one of the large ice-sheets (Greenland Ice Sheet and West Antarctic Ice Sheet) could be interpreted as a geophysical threshold in defining dangerous climate change. If one lives on a coral atoll however, sea level rise due to thermal expansion and glacier melting might obliterate one’s country long before commitment (in terms of greenhouse gas concentrations) to loss of either ice sheet. In addition, the science of climate is plagued by uncertainty about the likelihood of any given impact, and even about the magnitude of the uncertainty. The question is one of boundaries: Where does science end and value judgment begin? Or, how far might science take us toward the answer to the question: “What is dangerous climate change?”



Certainty may increase only gradually over the next few decades. Implementing policy to abate emissions need not, and in the view of many, should not, wait that long, if for no other reason than to assure that near-term decisions on emissions abatement (or lack thereof) do not foreclose objectives that may seem necessary once uncertainties narrow and greater consensus on an appropriate basis for judgment emerges (O’Neill & Oppenheimer, 2002). Climate policy decisions are being made

despite layers of uncertainty and in such cases the 'precautionary principle' should be guiding the decision making, as is enshrined in Article 3 of the Climate Convention⁴⁷. Recognition that evaluation of risks is not merely a matter of science provides an opportunity to explore the utility of a precautionary approach to defining "dangerous" climate change.

It could moreover be argued that there seems to be a wide gap between on the one hand the scientific debate on what constitutes 'dangerous climate change' which could be characterised as 'abstract', 'formal' and therefore in some sense even 'clean' and on the other hand the prospect of facing real 'dangerous climate change' felt in particular by developing countries as they are believed to be impacted hardest and have the least resilience and capacity to adapt. In this context, one could refer to a recent plea (Dessai et al., 2004) to recognise the central role played by perceptions of danger in defining dangerous climate change. It is argued that there are competing perspectives on dangerous climate change, which Dessai et al. term 'external' and 'internal' definitions of risk. External definitions are omnipresent in the current scientific debate, are usually based on risk analysis of system characteristics of the physical or social world. Internal definitions of danger recognise that to be real, danger has to be either experienced or to be perceived – it is the individual or collective experience or perception of insecurity or lack of safety that constitutes the danger. So, for example, in the context of climate change it is the perceived insecurity arising from realised or anticipated impacts associated with changing extreme weather events, and often immediate threats to life and livelihood, which are of greatest concern to individuals or, collectively, to society. This argument makes clear that climate policy urgently needs a certain degree of consciousness of the perceptions of people which will be affected by climate change. How this can be realised remains open but it might be envisaged as a more 'bottom-up' oriented approach focussing on the social vulnerability of individuals or groups to both existing climate variability and climatic change. This change in emphasis has already been noticed in the scientific debate concerning adaptation as described in Chapter 4. There, a shift from an abstract 'impacts and mitigation' context to a more concrete 'vulnerability and adaptation' context has been noticed. The same need to concretize may thus be observed in the debate regarding what constitutes 'dangerous climate change'.

The next IPCC Assessment Report (AR4) due in 2007 will have to address the question of dangerous climate change more explicitly than before. Also, the initial moves towards negotiating the next phase of the Kyoto Protocol (post-2012) will have to pay more attention to the question of danger. To decide on what constitutes dangerous climate change will finally be up to policy, based on the latest scientific knowledge. As made clear in the previous paragraphs, this decision making process should be guided by the precautionary principle and should pay attention to the diverse realities of climate change in a more bottom-up oriented approach.

To conclude the discussion on this 'environmental objective' building block, let us turn the attention to the analysis framework proposed above. Looking at the three axes of concern of this framework (see

⁴⁷ 'The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.'

Table 5.1), it is most obvious that a call for a more concrete long-term environmental objective is dictated by environmental concerns (Environment axis; Table 5.1). For developing countries however, who are believed to be hardest impacted by climate change because of their geographical position (i.e. tropical and subtropical) and lack of adaptive capacity, climate change poses a direct threat to their livelihoods and even their mere subsistence. From their point of view, a more concrete long-term environmental objective could be seen as a pure development concern, rather than an environmental concern (Economy and development axis; Table 5.1). Equity concerns have no direct implications for this building block although it could be argued that adopting a concrete long-term target could be regarded as equitable towards future generations (Equity axis; Table 5.1).

5.3.2. Commitments

While a long-term objective may guide action, the actual commitments agreed upon by the different parties will determine how emission trends evolve over the coming decades. Here, the challenge for the near future is both to broaden the geographical coverage as well as to deepen the level of mitigation achieved. In order to meet this goal, different types of possible future, internationally negotiated agreements can be conceived.

The obvious future pathway would be to continue on the basis of the agreements made under the Kyoto Protocol; that the absolute binding national emission targets of Annex I countries are renewed and strengthened for the second commitment period. However, some Annex I countries are starting to open up the question whether they should continue with the Kyoto type commitments or could take on different types of commitments, offering more flexibility and reducing economic uncertainty. In addition, there are discussions on which types of commitments would be assumed by Non-Annex I countries to encourage and achieve gradually more comprehensive participation in the system.

In this discussion many theoretical alternatives to absolute binding national emission targets have been proposed. The content of a commitment has both formal and substantive dimensions. One can make a distinction between different types of greenhouse gas limitation commitments based on three main characteristics. Firstly, one can distinguish between several levels of stringency of a commitment, based on its legal nature (binding vs non-binding; see below). A second characteristic is related to the question of who will be subject to commitments. Finally and most obviously, the choice of a concrete policy instrument is conclusive. After briefly discussing the first two characteristics, this paragraph presents a non-exhaustive overview of possible forms for future mitigation commitments, including quantified and non-quantified objectives.

A hot topic at particularly COP7 in Marrakech and a regular issue of discussion in the climate change negotiations is the legal nature of a parties' commitment: should these commitments be binding or non-binding? Bodansky (2003) outlines four main categories or levels of commitment:

- **Non-binding “commitments”** are an aim or a recommendation (“should” rather than “shall”). The emissions target in the UNFCCC for Annex I Parties, to return emissions to earlier levels or 1990 levels by the year 2000, was worded as an aim rather than a legal requirement (UNFCCC, 1992).

Other examples are commitments formulated in a very general sense, such as formulations in the UNFCCC on implementation of policies and measures and support of research and development.

- **One-way (“no-lose”) commitments** are an aim which, although non-binding, could have legal consequences if it can provide a country with certain legal benefits. Project baselines established under Kyoto’s Clean Development Mechanism are, in essence, one-way “commitments,” since a country (or firm) faces no penalty if its project exceeds a baseline, but receives certified emission reduction credits if the project reduces emissions below the baseline (Bodansky, 2003).
- **Legally binding commitments** are expressed in binding language (“shall”) such as used in the targets and timetables in the Kyoto Protocol. Even though most international commitments do not have any specific compliance mechanisms, they are legally binding and must be complied with by those states that accept the commitment (Bodansky, 2003).
- **Enforceable commitments** is a binding commitment which can be subject to a mandatory compliance system, with authority to respond to violations, such as the dispute settlement system adopted under the World Trade Organization (Bodansky, 2003). A compliance procedure was finally established with the Marrakech Accords, which has been adopted at COP11 at Montreal.

As mentioned, a second dimension of commitment types is related to *who* should be subject to commitments. Even though the international climate negotiations so far have sought to establish obligations only for states (which are Parties to the Convention or Protocol), it is conceivable that private entities, such as firms, organizations or cities might be subject to some kind of commitments. Under the Kyoto Protocol, national governments can establish commitments for private entities as part of implementing the national emission target. However, it would be very difficult to impose obligations directly from the international level on private entities due to implementation and enforcement problems, in particular with respect to individuals and firms located in countries that are not participating in the international regime (Bodansky, 2003).

A last, substantive, characteristic relates to the concrete policy instrument adopted. Two main categories can be identified: firstly, a form of quantitative emission cap can be applied and secondly, a variety of policies and measures having no direct quantitative emission limitation objective can be implemented.

The next section outlines a variety of possible forms for future mitigation commitments, including quantified and non-quantified objectives at different levels of stringency. In the description of the various commitment types, it will be discussed to what extent they meet the criteria of environmental effectiveness and economic efficiency. Also, it will be assessed to what extent different types of commitments deal with uncertainties in the economy and the uncertainty of abatement costs. Special attention will also be given to the opportunities and threats different types of commitments imply for possible developing country participation.

5.3.2.1. Quantified commitments

Quantified commitments, merely because of their quantifiable nature, are generally compatible with emission trading and are therefore put forward under the rationale of cost-effectiveness (See building block Market Mechanisms below for a discussion on emission trading). Also, quantified targets provide full flexibility of in-country implementation and constitute a clear basis for a compliance system, although the latter presupposes an adequate registration of greenhouse gas emissions.

5.3.2.1.1. Absolute (fixed) binding national emission targets

The most prominent type of target is the binding absolute emission targets as included in the Kyoto Protocol for Annex I countries. Countries are required to reach a certain level of emissions in a certain year and have to face consequences, if the level is not reached. A major advantage of using absolute binding targets is that they ensure certainty with regard to emission levels, guaranteeing the environmental outcome. Also, the familiarity of the international community with this form of commitment may be an important advantage in the discussion on future commitments, as it may help in building confidence among parties.

However, several Annex I countries and in particular the USA have expressed their concerns about the absolute targets as being too rigid and “capping” economic growth. Also, fixed targets leave the abatement cost uncertain. Countries may be more interested in trade-offs between certainty about environmental performance and certainty about the costs of mitigation – the latter of which can limit the acceptance of fixed targets. Fixed binding targets are generally opposed by developing countries based on equity concerns (historical responsibility) and development concerns as fixed targets are perceived as capping the necessary economic growth by developing countries.

In the following paragraphs a series of so-called flexible targets will be discussed which aim at reducing economic uncertainty, i.e. uncertainty on the evolution of the economy and uncertainty on abatement costs.

5.3.2.1.2. Flexible emission targets

Countries could take on more flexible emission targets as an alternative to absolute binding emission targets. Several options are possible, all of them aiming at providing more flexibility to the countries, so that extremely high costs are avoided if the economic development and therefore emission development is different than expected at the time of setting the target. Although it is sometimes argued that this flexibility would enable countries to take on targets that are more stringent (than they would under absolute emission reduction targets), it clearly reduces the certainty that a given emission level is really reached. Basically, the increased certainty in costs is traded against an increase in uncertainty in the total resulting emissions.

Dynamic or indexed targets

Dynamic targets are indexed according to an agreed variable, for example on the actual economic growth (Kim and Baumert, 2002). In other words, using this example, assigned amounts would be

adopted in advance and based on some expectation relative to GDP growth. Then, if the economic growth were more or less than expected, these assigned amounts would be revised upward or downward. These so-called “intensity targets” (defined as a ratio of greenhouse gas emissions to GDP) represent a particular form of dynamic targets. However, the indexation of assigned amounts could take various forms, and other variables (e.g., population, energy consumption, etc.) could also enter the picture and take into account, e.g., the role of agriculture in non-CO₂ GHG or the carbon intensity of energy consumption.

Clearly, the economic attractiveness of dynamic targets arises from the fact that they allow higher emissions in cases of higher economic growth, keeping the abatement cost rather constant. This is in sharp contrast to the situation of fixed targets, where the cost of abatement would increase with the quantity of abatement required. However, countries facing lower than expected growth or, worse, recession, could be penalised by pure intensity targets. Two primary factors influence such an outcome. First, GHG emissions may not be strongly correlated to economic growth: a slowing economy may not immediately lead to slowing emissions. Thus, as basic energy needs are not proportional to GDP, and capital stock turnover slows (and thus GDP decreases), baseline carbon intensity of the economy may grow, increasing the costs of achieving compliance. Also, countries might find it difficult to face even low costs of abatement when economic conditions deteriorate.

A major disadvantage of intensity targets is that the future emission level is uncertain: it depends on the future level of the GDP. As reducing absolute emissions of Annex I countries in the short term is essential, it seems a risky strategy to keep open the possibility of having higher emissions than expected. In particular, under higher economic growth, more resources should be available to reduce emissions. Emission trading would still be possible with an intensity target. The dynamic nature of the target clearly requires additional rules, as the total amount of allowances will only be known when the GDP in the target year is known. Either trading can only take place at the end of the commitment period or the amount of allowances is adjusted at the end of the commitment period, both options reducing ‘liquidity’ in the market.

Dynamic targets could, in principle, be an option for both developed and developing countries, since they allow for full differentiation – either through varying assigned amounts or indexation formulas. In the case of a pure intensity target however, the direct relationship between national emissions and GDP is not always apparent for developing countries thus increasing the uncertainty. Only for the few countries that are very advanced in their development and where the emissions are well correlated with GDP, intensity targets could be applied as a moderate first step to participate in the system.

Dual targets

Another way to design more flexible emission targets is to use *dual targets* (Kim and Baumert, 2002). Here, a country has two emission targets, rather than one. The purpose of the lower (more stringent) target is to provide an incentive to reduce emissions, since reductions below this target would enable the country to sell emission reduction allowances. The higher (less stringent) target would have a punitive function: exceeding this target puts the country out of compliance. Thus, the lower target

would be a selling target and the higher one a compliance target. No penalty would be assessed if emissions fell between the selling and the compliance targets. This area would be the safe zone, in which the country is neither out of compliance nor able to sell allowances through international emissions trading. The selling target, set at a more stringent level, would moreover reduce the risk of hot air.

While this approach does set targets, which have a positive environmental impact, such dual targets reduces certainty on the emission level, which is only guaranteed within a bandwidth. Emission trading would still be possible and would provide flexibility and avoid high costs due to unexpected developments⁴⁸.

Dual targets could be a possible first step for newly participating countries, with moderate development. This slightly weaker type of target would take into account the different responsibility of these countries. Dual targets could e.g. be used for those Non-Annex I countries with moderate development, where uncertainty of economic and emission growth prevents setting a single binding absolute target. For developing countries however, even a low level binding target seems to be out of the question, for the same reasons as mentioned for fixed binding targets.

Price cap

Another option is to introduce a “price cap” (Henry et al., 2004; Philibert et al., 2003). This could take the form of making supplementary permits available in unlimited quantity at a fixed price. This can be conceived at the international level (for countries) as well as on a country level (for domestic entities). With a price cap, all emission abatement needed to achieve the quantitative commitments would be undertaken as long as the marginal cost of abatement is lower than some agreed price. If abatement costs reach this price, parties or entities would be able to cover excess emissions with supplementary permits at the agreed fixed price⁴⁹. If abatement costs remain high this will obviously lead to higher concentration levels. It is important to note that in the Kyoto system the Clean Development Mechanism already serves essentially the same purpose as a price cap: additional allowances can be introduced in the system. The exact price of these additional credits is not known but is determined by the CDM market. This system moreover has the advantage that additional credits represent real reductions elsewhere.

A single international price cap is necessary for unrestricted global trading. However, trading might still be possible, albeit under more constrained circumstances, if prices vary across countries. It is also obvious that emissions trading would occur only up to the level of the price cap. It is clear that negotiating a common price cap could be a contentious task – perhaps equally difficult to negotiating a quantity target. While dynamic targets might help deal with cost uncertainty driven by economic growth and other factors, price caps might help deal more broadly with abatement cost uncertainty. In

⁴⁸ It should be added that dual targets could also be combined with dynamic targets, thereby reducing the uncertainty on abatement costs and economic development.

⁴⁹ It might be noted that this would mimic the effect of a carbon tax, which automatically adjusts abatement to match costs (see the discussion on carbon taxes below). For this reason, a price cap could introduce problems of adoption in some countries, as the cap can be perceived as a tax.

particular, price caps could also accommodate uncertainties in future technology developments and relative energy prices.

Concerns have been raised that a price cap could undermine the environmental effectiveness of any agreement as, similarly to intensity targets, a price cap would introduce uncertainty on future emission levels.

Non-binding 'no lose' targets

Non-binding targets offer another way to reduce cost uncertainty. They may take a form similar to that adopted in the UNFCCC, where Annex I Parties were to "aim" to return emissions to 1990 levels – but where there were no penalties for exceeding the goal. This option is essentially similar to the price cap option, in which the price is set to zero. By alleviating cost concerns it may allow adopting relatively more stringent targets.

Non-binding targets may also provide – though emissions trading – an incentive for emission reductions, where sales could occur if (and only if) actual emissions are less than the targets (Philibert, 2000). The option may be particularly attractive for some developing countries. However, the existence of such an incentive requires that other countries be potential buyers, that is, be bound by binding targets.

The primary disadvantage of a non-binding target option lies in the limited certainty it provides on environmental benefits. As far as developing countries are concerned, however, the possible environmental benefits may be higher than with fixed, binding targets, as these are likely to be rejected, or only accepted if they provide excess allowances. Non-binding targets may thus be a better choice. 'No lose' targets could thus be used for countries that have clearly lower development and emission levels compared to Annex I, but are important due to their size for the urgent global emission reduction effort. "No lose" targets could be an incentive mechanism for these countries to reduce emissions.

Sector targets

Sectoral targets can be considered as quantitative instruments of a limited scope; they focus on specific sectors, not entire countries. For example, targets could be specified for particular sectors or industries that are particularly important, politically easier to address, or comparatively insulated from international competition.

In Annex I countries, sectoral approaches are discussed quite actively in various fora, but their exact specification is often unclear. The common goal of sectoral approaches is to avoid competitiveness concerns across countries by applying the same rules for one sector to all countries. One option would be that the industry in one global sector would assume a target. For example, the automobile industry agrees to implement a *standard* for greenhouse gas emission per person kilometre. The responsibility to implement this target would be with the automobile industry and not with the national governments. All global automobile producers would be on the same level. Another option is that the responsibility remains with national governments but that the same rule for one sector is applied to all countries. This could be an emission standard or *benchmark* for a particular sector described, e.g., in greenhouse gas emissions per ton of steel produced. The commitment would

be the implementation of the standard, not to reach a certain emission level and emission trading would thus not be possible. Such targets can also only be applied for a few sectors with defined products, such as iron and steel or cement, but already there the difficulty lies in the detail of, e.g., defining which products belong to the sector and which do not. In addition, it has to be ensured that all relevant sectors are covered. A further option would be that *emission targets* are defined for all individual sectors as function of their respective output (e.g. ton of steel, kWh produced, etc.). Although the emission targets are defined for specific sectors, they can still be reached in a flexible manner across greenhouse gases and sectors and well as through emission trading. In this case the final allowable amount of emissions depends on the respective outputs in the target year (e.g. ton of steel, kWh produced, etc.); it thus boils down to an indexed target on a sectoral basis.

For developing countries, sectoral targets might be a pragmatic first step towards more comprehensive action. Sectoral targets could be seen as a natural outgrowth of the evolution of the Clean Development Mechanism (Samaniego and Figueres, 2002). Under such a scheme, countries might choose to expand from a specific “project” under the CDM to a broad policy covering an entire sector. Effects of specific policy actions would be judged against a reference scenario – and if they could be determined to generate reductions below what would happen without the policy, and those reductions could be quantified, they could be credited. As with other CDM projects however, there would be no obligation to act. The project developer (i.e. the country) would bear the entire onus for its programme. In essence, this builds on the “unilateral scheme” for CDM; it is also akin to a no-regrets policy, or even a non-binding target, to which it could offer a smooth transition.

Regarding environmental effectiveness, it is clear that sectoral approaches, by concentrating on some sectors and leaving other sectors uncontrolled do not cover all emissions. The dynamic nature would make total emissions uncertain. If such a target could provide an incentive for a (developing) country to participate that would otherwise not have participated, it would reduce the overall emission level. However, as has been discussed in chapter 3, there are doubts on the impacts which CDM can have, even when it is reformed to a sectoral CDM. Since it remains a market mechanism, it is unlikely that the geographical distribution will change substantially. Besides there are suspicions that unending disputes will surface about the meaning of additionality in turbulently developing economies. This may create an insecure environment for potential investors.

5.3.2.2. Coordinated policies and measures

As an alternative to quantified commitments countries could agree to implement coordinated policies and measures such as technology standards or taxes on greenhouse gases. In the negotiations toward Kyoto, coordinated policies and measures had been rejected by many countries, because they were seen as prescriptive and leaving less flexibility to the countries compared to emission reduction targets. To overcome this barrier, a menu of the best practice policies and measures could be provided, of which countries have to choose those that best fit their national circumstances. In such a system, it would be difficult to compare the stringency of the measures between countries. A system solely based on policies and measures would thus not allow for international emissions trading. In this

section, attention is first focused on a policies and measures approach focussing on the development needs of developing countries in the so-called Sustainable Development Policies and Measures. Policies across developed countries might also be adopted under new international agreements. Such policies and measures could cover various sectors and take numerous forms. Two specific forms are briefly considered here: technology agreements and carbon taxes.

5.3.2.2.1. Sustainable development policies and measures

Sustainable Development Policies and Measures (SD-PAMs) is a pledge-based approach to developing-country participation in mitigating climate change (Winkler et al., 2002). The approach focuses on implementing policies for sustainable development, rather than setting emission targets. The SD-PAMs approach recognizes as a political reality that concerns with climate change (and, in some cases, even environmental policy more broadly) are marginal for many developing countries, and lower in national priority than economic and development policies.

The SD-PAMs approach starts from the development objectives and needs of developing countries. Countries begin by examining their development priorities and identifying how these could be achieved more sustainably, either by tightening existing policy or implementing new measures. The next step is to identify synergies between sustainable development and climate change, that is, those SD-PAMs that also result in reductions of GHG emissions.

The SD-PAMs approach suggests working backwards from a desired future state of development. Key development objectives typically include poverty eradication, job creation, food security, access to modern energy services, transport, drinking water, education, health services, and land. Development is needed because the number of houses to be built, mouths to be fed, and dwellings to be lit and heated is growing. Sustainable development is understood as providing for these basic human needs in a way that can continue over time, result in less damage to the environment, and provide more social benefits and long-term economic development. Sustainable development must be driven by local and national priorities. Although documents such as the United Nations Millennium Declaration (UN, 2000) and the New Partnership for Africa's Development (NEPAD, 2001) articulate goals at the international and regional levels, each country will have its own set of development priorities. The meaning of sustainable development is shaped by the values of each society, and no single approach is appropriate for all economies (Munasinghe, 2001). One of the strengths of the SD-PAMs approach is that it acknowledges and starts from the premise that development and sustainability are country-specific.

The basic assumption of an SD-PAMs approach suggests that countries that act early to move to greater sustainability in their development path will start "bending the curve" (Raskin et al., 1998) of their emission trajectory. This hypothesis is supported by the latest findings of the International Panel on Climate Change (IPCC, 2001c). According to the IPCC, a low carbon future is "associated with a whole set of policies and actions that go beyond the development of climate policy itself" (Morita and Robinson, 2001). Moving toward a sustainable development path could avoid burdensome future mitigation efforts and even have a greater long-term impact on emissions than pure climate change policies. Thus, the major contribution of SD-PAMs lies not in promoting mitigation effort per se, but in changing the reference scenario of emissions from "conventional" to "sustainable."

As the SD-PAMs approach is national in character, it does not have links to international emissions trading. However, implementations of SD-PAMs that reduce GHG emissions are likely to be good candidates for investment under the Clean Development Mechanism. The CDM requires that projects reduce emissions and promote the sustainable development objectives of the host country; thus, the CDM has a clear synergy with the SD-PAMs approach. Through the CDM and the tradable emission credits generated, developing countries would have some link to the emerging market for carbon credits. The prospect of a sector-CDM (see above) adds further potential because actions under the SD-PAMs approach would involve broader policies (e.g., changes in prices of energy) that could not currently qualify as CDM projects.

Without quantified targets for GHG emission limitations, the SD-PAMs approach cannot guarantee a specific level of global GHG emissions. SD-PAMs therefore has to be seen as a first step in the regime.

The SD-PAMs approach should be attractive to all developing countries, since it starts from their own development objectives. The approach should be particularly interesting for developing countries such as South Africa, for which a global allocation provides no surplus credits to sell (and, hence, little incentive to join the system). These are likely to be countries that have already industrialized to a significant extent or, as a result of their particular endowment of energy resources (e.g., large fossil fuel reserves), have used up significant portions of their share of acceptable emissions in a global allocation scheme. The approach should also be attractive to least developed countries. The attraction is based on the particularly urgent need for development of least developed countries. A focus on sustainable development would make more sense than any commitment to reductions or limitations of GHG emissions from least developed countries, which are small by international standards.

5.3.2.2.2. Technology agreements

As an alternative to quantified emission targets, some proposals have been made to develop agreements on technology cooperation. Stabilising greenhouse gas concentrations will ultimately require phasing in 'low' and 'zero carbon' technologies, technologies fulfilling energy and other needs while not emitting carbon dioxide or other greenhouse gases. It has thus been suggested that, as one means of promoting the development and diffusion of advanced technologies, international co-operation could focus on an agreement – or a set of agreements – promoting some of these low carbon technologies (Edmonds and Wise, 1999).

Such agreements may themselves have different forms. They could tend to impose specific standards in some sector (e.g. power sector; see also paragraph on sector targets); more directly tend to subsidise research and development efforts; or aim at broadening existing markets for technologies such as renewable energy sources. Such technology agreements could possibly build on and link together current initiatives with similar aims, such as the IEA implementing agreements, the Climate Technology Initiative, or some programmes of the Global Environment Facility (Philibert et al., 2003).

While such agreements would certainly be useful, they face a number of hurdles if they are to be successful at achieving stabilisation at acceptable levels. Perhaps the principle concern is that of timing. There is an enormous potential in the next decades for large emission reductions through

technology advances (IPCC, 2001c). However, the sheer volume of agreements may be impossible to negotiate if each sector and each technology requires a separate effort – and without this level of effort, the remaining policies might prove inadequate. One way to remove this hurdle would be to focus on some priority sectors, for instance, those sectors faced with international competition, for which other measures are more difficult to adopt and implement

Implementation of technology cooperation agreements does not provide certainty on future emission levels. Technology cooperation on the development of new technologies focuses on reductions in the long term and alone would be unable to achieve short-term reductions. Such agreements would also not provide the flexibility of emission targets. Technology development is essential to be able to reduce emissions drastically in the long term, but it needs to be supplemented with measures to reduce emissions in the short-term.

5.3.2.2.3. Carbon taxes⁵⁰

Carbon taxes have been suggested as possible alternatives to the Kyoto framework. Under a commonly assessed form (Nordhaus, 2002), domestic carbon taxes could be harmonised at international level. In this case, carbon taxes would equalise the marginal cost of abatement globally and thus share with emissions trading based on quantified objectives the feature of cost-effectiveness.

Carbon taxes offer another advantage: that of adjusting spontaneously the amount of abatement to the reality of abatement costs. While they would provide no guarantee on emission levels, they would control marginal costs – and it might be argued that, given the long term nature of climate change, they better deal with cost uncertainties (see paragraph on fixed targets above).

Carbon taxes, however, have been politically unacceptable to some developed countries in an international context – even less so than quantified objectives. Furthermore, it seems clear that developing countries would be unwilling to adopt such an instrument. If harmonised at the international level, taxes also raise concerns about sovereignty. However, taxes also meet opposition at domestic levels from various perceived interests in virtually all countries.

5.3.2.3. In summary

Summarizing, there are two (non-exclusive) ways to commit to mitigation: countries can take on quantified emission targets and/or commit to certain policies and measures not necessarily aimed at reducing greenhouse gas emissions. Both options can come in differing levels of legal stringency, i.e. non-binding, legally binding or enforceable commitments. Quantified commitments, merely because of their quantifiable nature, are generally compatible with emission trading and are therefore put forward under the rationale of cost-effectiveness. Contrary to a policies and measures approach, quantified commitments also provide full flexibility of in-country implementation.

There are two basic types of quantified emission target: absolute binding emission targets and flexible emission targets. Absolute 'Kyoto-style' emission caps are emission targets fixed at national level relating emissions to a base-year. The major advantage of binding quantified emission targets is

⁵⁰ See also the discussion on price caps above.

that the emissions reductions are known, guaranteeing the environmental outcome (Environment axis; Table 5.1). On the other hand, there is no certainty on the future costs of achieving the commitment. As an alternative to absolute binding emission targets, countries could take on more flexible targets. Several options are possible, all of them aiming at providing more flexibility to the countries, so that extremely high costs are avoided if the economic development and therefore emission development is different than expected at the time of setting the target (Economy and Development axis; Table 5.1). The increased certainty in costs is traded against an increase in uncertainty in the total resulting emissions.

As has been shown in the variety of proposals, various options are available to facilitate the (gradual) participation developing countries. The group of developing countries is very diverse, not all countries would necessarily take on the same type of target at the same time. Several less stringent options are available for developing countries to start participating in the system. In particular, Sustainable Development Policies and Measures (SD-PAM) may be seen as an attractive first step in participating in the regime for developed countries, which reject quantified emission targets on the basis of equity concerns (historical responsibility) and development concerns (capping economic growth). Development is the key priority for developing countries and the challenges of meeting basic needs are viewed as more important than the challenge of combating climate change (Economy and Development axis, Table 5.1). In this respect, SD-PAM is a specific pledge-based policies and measures approach to securing the participation of developing countries.

Besides the obvious environmental and economical-developmental concerns present in this building block, equity may also be addressed. Applying different types of commitments to different parties ('multi-stage approach'; see also under differentiation framework) may indeed add to guaranteeing an equitable outcome in designing a climate policy.

5.3.3. Differentiation of commitments

This building block deals with the issue of how the global effort for combating climate change can most effectively be divided among the participants of a future international climate regime. As this building block deals with distributional aspects of climate policy, it is clear that equity concerns will be at the forefront of any discussion on burden sharing. Ashton and Wang (Ashton and Wang, 2003) argue that, given the fact that involvement in international climate negotiations is voluntary, a necessary condition for the success of a future agreement is that it is both fair *and* perceived to be fair by all parties. As discussed above however, equity is a subjective issue, and one which is often hard to disentangle from interests. How does one distinguish between the different responsibilities, capabilities and needs of the different parties when allocating commitments? A first paragraph will present an overview of the main approaches to differentiating commitments between parties, followed by a brief discussion of main actual proposals for differentiation.

5.3.3.1. Approaches to differentiation

There is a variety of ways in which commitments could be differentiated (REF):

- **Differentiation by form of commitment:** some proposals suggest assigning different types of commitments to different types of countries. Differentiation by form of commitment is already visible in the Convention and the Kyoto Protocol, where Annex I countries have agreed to cut their collective emissions by 5.2 per cent below 1990 levels by 2010 and non-Annex I countries are exempt from quantitative emission limitation targets.
- **Differentiation in stringency of commitments:** some proposals differentiate targets in terms of stringency, an approach also used in the Kyoto Protocol. Within Annex I countries, some countries are obliged to make emissions reductions, some have pledged to achieve stabilisation and others have been permitted to make increases.
- **Differentiation in timing of commitments:** the basic idea here is to give developing countries more time to achieve their commitments. Some of the proposals explicitly reflect this temporal dimension, setting forth a pathway for developing countries first to participate in the commitments regime and then to assume progressively more stringent commitments, as they develop economically and pass the defined differentiation/graduation thresholds.

It is also important to consider two different procedural approaches, pledge and principle-based, to negotiating commitments. This distinction is important because it determines a starting point for negotiations and, more fundamentally, reflects differing and perhaps conflicting ways of viewing the challenge of climate protection. Generally, the international negotiating process is best characterized as pledge-based; countries formulate their national positions and negotiate in their interests, voluntarily making commitments (alone or with other countries) at their sovereign discretion.

Because the international legal order lacks the ability to require a country to participate, the tradition has been for countries to “pledge” particular actions in a bottom-up style. These commitments typically represent some divergence from the business as usual (reference) or historical levels (e.g., targets relative to 1990 emission levels). This pledge-based approach reflects the voluntary assent rule and the ‘realpolitik’ of international negotiations. Bottom-up negotiation processes like the Kyoto Protocol have been criticized as *ad hoc*, with negotiated results shaped mainly by political power and economic might rather than by objective criteria. Thus, many have called for negotiation on overarching equity principles or rules that, once agreed, would guide the subsequent emission reduction efforts among nations in an orderly fashion. For instance, in the first session of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol, held in Bonn, Germany, from 17-26 May 2006, Japan said the second commitment period should be based on a thorough scientific analysis and should not be a ‘political exercise’ (ENB on SB24).

Principle-based approaches are often advanced under the mantle of *equity*. Furthermore, many believe that, given North-South disparities in negotiating capacity and power, a principle-based approach to negotiating commitments is fairer *procedurally*. Some developing countries indeed

question whether they can ever get a “fair deal” if emission commitments are determined on the basis of raw bargaining power. It is however important to note that principles of equity are also relevant to pledge-based targets. It is likely that countries will invoke a variety of principles to justify proposed targets. In determining what is fair, as discussed above, countries are likely to rely on other (but related) Convention principles, such as responsibility, capability, as well as national circumstances (Art. 3.2) and sustainable development (Art. 3.4). Estimated compliance costs (‘comparability of effort’; see above) will also, no doubt, be a major determining factor in negotiations over the relative stringency of future commitments.

5.3.3.2. Differentiation frameworks

This section reviews the most prominent proposals of allocating commitments in an emission cap regime. Six approaches are presented: the multistage approach, the contraction and convergence approach, the Brazilian Proposal, the ability to pay approach, the triptych approach and the equal mitigation cost approach. Several variants of each approach circulate and can, one way or another, be brought back to the basic elements of the approach presented here. For a very comprehensive overview of approaches, the reader is referred to Bodansky (2004).

5.3.3.2.1. Contraction and Convergence

The contraction and convergence scheme, which is based on per capita indicators, addresses the equity principle of equal entitlements (Meyer 2000). It mainly involves two steps: (1) specification of a global emissions pathway, setting forth emissions in each year, leading to an agreed long-term CO₂ concentration level (e.g. 450 ppm by 2100) (“contraction”); (2) sharing of the yearly global emission limit among countries so that per capita emissions converge (e.g. by 2045).

The per capita entitlements of the developed countries would thus decrease, while most developing countries would be allowed to increase emissions. The contraction and convergence scheme is in fact a compromise between the principle of grandfathering and Per Capita entitlements, where the latter is mixed into the former over the convergence period with larger emitters thus having more, but decreasing, emission entitlements at their disposal than minor emitters. The major advantage of using per capita indicators in the burden-sharing scheme is the simplicity of the concept and the strong ethical basis, which is consistent with the major guiding principles of the UNFCCC. It would not require developing countries to shift their focus away from their basic needs and, by emphasising entitlements as well as commitments for high-emission countries, it addresses responsibility and capacity. Broad participation would increase the possibilities of cost-effective mitigation as long as flexible mechanisms are available.

There are some major drawbacks, however. Firstly, important countries will incur large losses from the contraction and convergence regime. Secondly, the per capita approach lacks the flexibility to accommodate varying national circumstances. Climatic conditions and economic structure, including the energy supply, have an important impact on emissions. The system would thus have adverse effects on nations with cold climates and favourable effects on nations with high endowments of, for instance, hydro resources (e.g. Brazil; see Chapter 2). As a consequence of these shortcomings,

some proposals allow for country-specific characteristics that explain significant variations in emission per capita (e.g. GDP/capita (Gupta and Bhandari, 1999)).

Ultimately, almost any conceivable long-term solution to the climate change problem will embody a high degree of contraction and convergence. Greenhouse gas concentration cannot stabilise unless total emissions contract and emissions cannot contract unless per capita emissions converge. The question in the coming negotiations is not whether this is reasonable within an equity perspective, but whether to base the negotiations explicitly on it (Ashton and Wang, 2003).

5.3.3.2.2. The Multi-stage approach

'Increasing participation' or multi-stage approaches have been developed by Gupta (1998), Stewart and Wiener (2001) and den Elzen et al. (2003). "The aim with such a system is to ensure that countries with comparative circumstances in economic, developmental and environmental terms have comparative responsibilities/commitments under the climate regime. Moreover, the system defines when their level of responsibility/commitment change as their circumstances change" (Berk et al. 2001). The parties may be grouped according to mainly economic criteria and emissions levels.

According to the 'Original Multistage' proposal, countries participate in several stages according to a per capita GDP threshold. A low per capita GDP thus results in no commitment (stage 1), while a higher per capita GDP would imply gradually moving from business as usual to decarbonisation (stage 2), stabilisation (stage 3) and ultimately reduction commitments (stage 4).

The multistage approach does not express burden sharing in the final stage. The approach could thus be combined with other approaches based on equal entitlements, responsibility, capabilities, opportunities and comparability of effort. The important component in the multistage approach is that it addresses the equity principle of need in acknowledging the needs of poor countries. The primary concern for these countries is development, and they are thus exempted from commitments to reduce emissions.

The Climate Action Network (CAN, 2003) proposal is another variant of such a multi stage approach operating on a very similar timetable divided in three tracks: a Kyoto track for developed countries, a Greening (decarbonisation) track for developing countries and an Adaptation Track for those countries worst affected by climate change. The Kyoto track builds upon the UNFCCC and the Kyoto Protocol approach, with its system of legally binding absolute emission reductions and compliance regime. The 'Greening' (decarbonisation) track, financed by developed countries, would drive the rapid introduction of clean technologies that can reduce emissions and meet sustainable development objectives in developing countries while the Adaptation track provides the resources to the most vulnerable regions (especially small island states, least developed countries) to deal with unavoidable climate changes (see Chapter 4 on adaptation). As the income and emission levels of developing countries increase, they graduate first from the decarbonisation to the Kyoto track and then, within the Kyoto track, from a stabilisation to a reduction target.

5.3.3.2.3. Historical responsibility approach (Brazilian Proposal)

Distributing commitments in accordance with relative historic responsibility was originally a Brazilian proposal from July 1997 (BP (1997) and Rosa et al., 2003). Emission reduction efforts are allocated according to each country's relative responsibility for the global temperature increase. The framework is built on the concepts of "common but differentiated responsibilities and respective capabilities" and the "polluter pays principle" and clearly addresses the equity principle of historical responsibility. The collective responsibility of the Annex I countries is equal to 76 percent of the historic temperature increase of 0.6 degrees. The remaining 24 percent relates to historic GHG emissions in developing countries (see also table 2.1. in Chapter 2). It should be noted that the exact responsibility ratio is influenced by scientific and model uncertainties.

The design of an indicator for responsibility for climate change is crucial in this kind of an approach. The indicator can be based on emissions, concentration, radiative forcing, temperature increase or impacts. As explained in the discussion of the building block 'environmental objective', uncertainty cascades throughout this cause-effect chain; the largest uncertainty associated with indicators on for responsibility for temperature increase. Other possible responsibility indicators are contribution to the greenhouse gas concentration level or simply historically accumulated greenhouse gas emissions. The latter has been used in a burden-sharing proposal based on the concept of ecological debt, elaborated in Paredis et al. (2004).

Perhaps the strongest point of this approach is that it is based on science and not on strong bargaining power. It is indeed undisputed that global warming is a consequence of the increased concentration of greenhouse gases in the atmosphere, which is a function of emissions that accumulated over time. The framework is thus a useful reference for the developing countries, when industrialised nations put the focus on their economic losses from combating climate change.

5.3.3.2.4. Ability to pay approach

The basic equity principle behind this burden-sharing scheme is the concept of capacity. Emission targets are allocated based on ability to pay, as measured by GDP per capita (Jacoby, H. et al., 1999). The original proposal includes the imposition of a long-term emissions constraint to connect near-term emission reductions to the regime's long-term objective and the adoption of ability to pay (as measured by GDP per capita) as the graduation criterion for assumption of targets by developing countries and the burden-sharing formula for allocating national targets.

UNFCCC Article 3.1 refers to "respective capabilities" implying that ability to pay should somehow be taken into account in a final burden-sharing scheme. Article 3.1 also mentions that the "developed country Parties should take the lead in combating climate change". The scheme would obviously allocate the majority of the costs to the developed countries. As the developing countries become wealthier over time they would increasingly be able to pay for mitigation.

The ability to pay approach could be interpreted as all countries bearing the same reduction in GDP per person or as some countries bearing a proportionally smaller burden. The two interpretations of ability to pay will of course affect the other equity principles. Allocating targets according to equal income reductions per person could, for instance, violate the principle of need. Countries with low per

capita income do not have the capacity to invest any effort in reducing emissions as their overriding priority is on providing a decent standard of living.

The advantage of this approach is the direct link to the principle of “respective capabilities”. The approach also addresses the issue of whether the developed countries should take the lead. The disadvantage of the scheme is that it is a top-down approach; country-specific circumstances possibly justifying some divergence from the principle.

5.3.3.2.5. The triptych approach

This methodology was originally developed and has been successfully applied to allocate commitments to the member states within the European Union. This approach distributes emission mitigation efforts based on the emission structure of the countries. The original triptych approach thus analyses the heavy industry sector, the power producing sector and the domestic sector. This approach was later extended to include also process emissions from industry, agriculture, waste and land-use change and forestry (Höhne et al. 2003), which makes it more relevant if developing countries were to be included. The emissions of sectors are treated differently: for ‘electricity production and industrial production’, a growth in the physical production is assumed together with an improvement in production efficiency. This takes into account the need for economic development but constant improvement of efficiency. For the ‘domestic sector’, convergence of per capita emissions is assumed. This takes into account the converging living standard of the countries. For other sectors, similar rules are applied, the allowances of the different sectors being added up to one fixed binding commitment for each country. By focussing on efficiency improvement, this approach addresses the equity principle of opportunity, attributing bigger emission reduction efforts to countries with a higher efficiency improvement potential.

A similar approach is the so-called multi-sector convergence approach (Sijm et al., 2001). The analysis is extended to seven sectors (power, industry, transport, households, services, agriculture and waste) and aims for converging per capita emissions of sectors. The inclusion of more sectors makes the multi-sector approach more flexible since more country-specific circumstances could be managed. Extending the number of allowable factors into the approach will increase the likelihood of achieving a fair result, but it will also make the result less transparent. Also here, the single sectoral targets are added to form an absolute binding national target, leaving it up to each country to allocate their mitigation effort between the sectors.

Both the triptych and the multi-sector convergence approach are bottom-up approaches. They avoid the disadvantages of the simple per capita indicators, as country-specific characteristics are included. On the other hand, the need for data is usually greater compared with the top-down methods.

5.3.3.2.6. Equal mitigation cost approach

Equalising relative mitigation cost is another burden-sharing scheme. The approach originates in the equity principle of comparability of effort. Targets are constructed to distribute the economic burden equally over all countries. The economic burden could include both mitigation and adaptation costs and it could be calculated relative to GDP. The relative economic cost as a percentage of GDP would

thus be equalised. This implies that countries would have to agree in advance on a single economic model to calculate the inferred costs of mitigation and adaptation targets.

The approach has two serious disadvantages. Firstly, there are technical problems, as it is highly unlikely that countries could agree on a model to calculate mitigation and adaptation costs. Second, this approach, similar to the ability to pay approach, does not address the needs of the developing countries. An approach based on equalising the mitigation cost relative to GDP would place the same economic burden on developed and developing countries alike.

The approach could nevertheless be an important guiding principle when developed countries are to distribute commitments within a new bubble, for instance. Economic cost is central for the developed nations and equalising relative costs could be perceived as a fair burden-sharing scheme within the developed nations.

5.3.3.3. Comparing frameworks

From the brief discussion on the different approaches, it has become clear that there is a trade-off between the various equity dimensions and that no approach to differentiation satisfies all of the criteria completely. The top-down approaches (contraction and convergence, the historical responsibility approach, the ability to pay approach and the equal mitigation cost approach) do not allow for country-specific variation, which could imply that some countries are imposing strict reduction commitments even though they lack good domestic mitigation opportunities. However, country opportunities are not restricted to national opportunities – all countries have access to the same pool of opportunities when international emission trading is applied. The alternative bottom-up approach (the Triptych approach) allows for country-specific variation and the starting point for attributing commitments are thus the mitigation opportunities within each country. Unfortunately the bottom-up approach fares badly on other equity aspects. Commitments based on the triptych approach could thus be independent of the country's historic responsibility or capacities. Russia is an example of a country with good mitigation opportunities, but it is important that commitments are shared according to other equity aspects as well.

The equity aspects of responsibility, capacity and need are to some extent correlated. A burden-sharing principle aimed at historic responsibility or equal per capita entitlements, for instance, will imply emission reduction among the rich countries while the developing countries will avoid stringent commitments. There are of course also exemptions, e.g. Russia, which has a high historic responsibility but lacks capacity compared to other industrialised countries. Some countries have also undergone the transition to a high-income country with only a relatively small contribution to global warming.

Comparability of effort is an important equity aspect for many countries. The equal relative mitigation cost approach addresses this aspect best, but this approach does have many other flaws. The ability to pay approach also fares well on the comparability aspect, as countries contribute to combating global warming according to their per capita GDP. The contraction and convergence approach, the historical responsibility approach and the Triptych approach all partly fulfil the

comparability of effort criteria. Under these burden-sharing principles, the relative effort with similar countries will be the same.

Most probably, none of the approaches will prevail in its pure form in a final burden-sharing scheme. As the approaches mentioned are only one way of operationalising one equity principle, it may be clear that a negotiated differentiation framework will probably draw on different elements from the respective approaches. As illustrated by Ashton and Wang's concept of the 'equity space', equity cannot be reduced to a single factor. So even though the principle of equal per capita entitlements, for instance, is a strong and easily understood ethical argument, the scheme could be opposed by nations who would rely on other dimensions of equity, such as opportunity or capacity.

In terms of developing country interests, Najam et al. (2003) argue that "the creation of a predictable, implementable and equitable architecture that can stabilize atmospheric concentrations of greenhouse gasses within a reasonable period of time, while giving all nations a clear indication of their current and future obligations" is essential for a viable post-2012 climate architecture. In such a post-2012 framework, targets should not be based on pledged short-term commitments, but on a long-term atmospheric stabilization objective. Subsequently, allocation rules based on clear and objective principles would present all countries with a clear signal on what is likely to be expected of them in the future. Such a principle-based approach to negotiating commitments, which is also considered as being fairer on a procedural level, should be designed in such a way that it is fair and perceived to be fair by all parties, North and South (Equity axis; Table 5.1). Instead of a convoluted system of arbitrary percentage cuts for different countries, Najam et al. (2003) argue, having a standard global emissions budget linked directly to the atmospheric stabilization would not only be more elegant and equitable but also more manageable in the long-term.

Besides the obvious equity concerns, this building block bears some environmental as well as economical-developmental aspects as well. From an environmental point of view, it can be argued that a principle-based approach, contrary to a pledge-based one, is preferable as it guarantees a certain environmental target to be met (Environment axis; Table 5.1). Concerned about their development, developing countries may claim emission rights in order to meet their development objectives. Developed countries on the other hand, have locked themselves into a fossil-based infrastructure and could therefore argue to apply some degree of grandfathering in distributing emission right to take this into account (Economy and development axis; Table 5.1).

5.3.4. Market based mechanisms

Market based mechanisms, such as international emissions trading, are widely promoted by the international climate community in efforts to address climate change, the main argument being cost-effectiveness, a principle enshrined in the Climate Convention (Article 3.3). Emissions trading supports this principle based on the assumption that a market will allocate resources in the most efficient way and thus minimise costs of climate action by providing incentives for emission reductions to be undertaken where they are the least costly. Countries differ with regard to their marginal abatement costs because of their different dependence on production activities that emit GHGs, their relative

resource efficiency and their dependence on and access to energy sources (coal, gas, etc.). Under these conditions, each entity obliged to reduce emissions by a fixed amount is supposed to gain from trade, as long as costs differ between the trading entities.

The basics of international emissions trading are quite simple. First, governments must commit to quantifiable emission limitation targets (see building block on greenhouse gas limitation commitments above). Second, such targets are divided into discrete, tradable units, e.g. one ton of carbon dioxide or the equivalent amount of another greenhouse gas. These tradable units are often referred to as allowances, because they “allow” the “owner” to emit a specified amount of greenhouse gases. Governments may choose whether to distribute these allowances to domestic emitting sources. Third, allowances could then change hands in several ways—in trades between governments, between a governmental and a private entity, and between private entities. The party purchasing allowances is entitled to emit more; the party selling those allowances is required to emit less.

The Kyoto Protocol incorporates an International Emissions Trading (IET) system, as well as two project-based market mechanisms, Joint Implementation (JI) and the Clean Development Mechanism (CDM):

- **International Emissions Trading:** The national emission reduction obligation under the Protocol is interpreted as a national emission quota. If a country does not use up its emission quota (or allowance) completely, it may transfer or sell the unused portion of these Assigned Amount Units (AAUs) quota to another country. Accounting provisions in the Protocol ensure the environmental integrity of emissions trading between Annex B Parties by explicitly requiring a transferring Party to deduct the transfer from its assigned amount before the acquiring Party can add the transfer to its assigned amount. In contrast to the other emissions trading systems described below, the Kyoto Protocol does not limit such transfers to transactions where emissions reductions are “additional” to what would have occurred in the absence of the transactions.
- **Joint Implementation:** Developed countries and countries with economies in transition may jointly implement greenhouse gas emission reduction projects on the territory of one country and then “share” the effect of these projects during the period 2008-2012 by way of transfers of Emission Reduction Units (ERUs) generated by such Joint Implementation projects. The availability of this type of emissions trading is limited to Annex B Parties that are also members of Annex I of the UNFCCC. The Protocol’s accounting provisions require that these transfers get the same accounting treatment as emissions trading. The Protocol limits this type of trading to projects that provide emissions reductions that are ‘additional’ to any that would otherwise occur.
- **Clean Development Mechanism:** This mechanism was proposed by industrialised countries as a means of meeting their overall Kyoto Protocol obligations with greater flexibility. In essence, industrialised countries would earn Certified Emission Reductions (CERs) for their investments in emission reduction projects in developing countries which would be offset against their domestic emission obligations. In addition to lessening the cost of greenhouse gas emission cuts, CDM explicitly aims at promoting sustainable development in the developing world. The developed country gains credits for the emissions reduced, while the developing country gains projects and help with capacity building, technology, environmental remediation and socio-economic

development. Annex B Parties may in this way acquire CERs resulting from cooperative projects undertaken in Parties that have not yet adopted legally binding targets. Because the host countries of such projects have not adopted legally binding emission limitation commitments, greater scrutiny is required in order to ensure that such project-based transactions involve actual reductions below what would have otherwise occurred (in a business as usual or 'baseline' scenario) in the host nations. This 'additionality' test is therefore essential to the environmental integrity of the CDM, since it is only through such a test that any project's emissions reductions can be identified as truly 'extra' and therefore available for offsetting emissions elsewhere. The general rules to guide implementation of the CDM were agreed to in what is known as the Marrakesh Accords.

Opponents of emission trading fear that such a regime could allow rich countries to buy their way out of reducing their own harmful emissions and that it would undermine the sense of shared responsibility required in the negotiations. Allowing countries to trade emission credits implies that emitting greenhouse gases is not fundamentally wrong but in fact acceptable as long as the polluter can afford to pay the fee. Several objections have been raised, in particular from the G77 and NGOs, against too much flexibility for fulfilling commitments through international transfer rather than domestic action. As global climate change effects have their local origins mainly in the North, responsible action therefore has to be local in the first place, relieving the burden from other countries. Too much flexibility in the Kyoto Protocol could thus relieve Western industrialised countries from the pressure to initiate structural changes in their economy towards long-term technological and societal innovation.

Beside these moral arguments, the demand for environmental effectiveness poses serious questions on the applicability and efficiency of emissions trading. The 'hot air' accumulated in the Eastern European Countries with Economies in Transition presents a serious threat to this principle. Without trading the enormous 'reductions' achieved especially in Russia (minus 30 % from 1990 levels) would be 'lost' and not emitted into the atmosphere; now these 'reductions' will be put on offer by Russia resulting in higher factual emissions than without trade. Proposals for 'greening AAUs' (also known as Green Investment Schemes; GIS) have emerged as a result of a desire on the part of some Annex I countries to enhance the political acceptability of purchasing AAUs from countries with economies in transition when these AAUs are seen as resulting from the decline of their economies. GIS involves ensuring that revenues from AAU trading are directed to projects that generate real environmental benefits. GIS are not a defined element of the Kyoto Protocol however; they are a preference on the part of buyers and there is thus no formal accepted definition of 'green credits'. Besides, 'hot air' is also felt as a threat to developing countries, as these cheap emission allowances decrease the possibilities for developing countries to enter the market via CDM. As developing countries are only eligible for CDM activity, they will face stiff competition for these funds so essential to their developmental concerns.

A similar concern for the project-based mechanisms JI and CDM is that of 'environmental additionality'. Since any project to be credited is supposed to generate climate change benefits, which would not be available otherwise, it becomes crucial to draw a line between 'normal' and 'additional'

projects. A so-called baseline scenario has to be determined against which the specially achieved emission reductions can be calculated. In this procedure lies a real danger of 'codifying' the dominant, conventional view of development. Because both the receiver and the investor countries have an interest in assuming an 'emissions intensive' business-as-usual, this procedure of defining baselines could well prove to be counterproductive for a country's search for sustainability. The more conventional the baseline chosen, the more additional funds or credits, respectively, can be recovered from the flexibility operation.

Besides environmental additionality, financial additionality has been forwarded as a concern to developing countries who want to make sure that financial transfers under the CDM have to be additional to other mechanisms like the Official Development Assistance (ODA) and the Global Environment Facility.

Another reason for concern, especially with JI and CDM, is connected to the idea of 'picking low-hanging fruits'. Emission abatement which comes cheap, i.e. with a low marginal cost, is likely to be harvested away early, with the credits going to the high-emitting countries. This could result in two different effects. Firstly, receiving countries sell easy reduction possibilities at an early date, leaving themselves with the more expensive reductions later on. Secondly, investor countries have little incentive to adjust their own development path in a less carbon-intensive and more sustainable way, running the danger of getting further locked into a fossil development path.

Ott and Sachs (2000) suggest to balance the demands of cost-effectiveness and the necessities of environmental effectiveness by charging a fee on all transactions under the proposed market mechanisms. At this moment, only transactions under the CDM are 'taxed'; 2 % of the proceeds of CDM projects is directed towards the Special Adaptation Fund (See Chapter 4 on Adaptation). Taxing transactions under all the market mechanisms would improve the comparative advantage of taking domestic action to reduce GHG emissions while generating more resources which might be used to assist developing countries in adapting to climate change. It would moreover provide a more level playing field between the three Kyoto market mechanisms, making an end to the 'discrimination' of the CDM, the only mechanism through which developing countries have access to the carbon market.

The most lasting contributions from the developing countries will come not from their ability to cut emissions on the cheap, but from their ability to benefit from technological leapfrogging in long-term infrastructure. In this view, the carbon market should be a means rather than an end, and its success should be measured by how it assists countries in meeting their climate change and sustainable development commitments and priorities. The CDM is currently the only mechanism for developing country participation in the carbon market. Options could be explored to expand and complement the CDM in a way that recognizes the differing national circumstances of developing countries. As explained under the paragraph on commitments, Samaniego and Figueres (2002) outline a sector-based CDM that builds on the already operational project-based CDM. A sector-CDM would represent an expansion of the scope of the CDM to cover entire national sectors (such as cement or power production) or geographic areas (such as a municipality). This approach could then support emission reductions and sustainable development benefits — the two expected by-products of the CDM — across a wider array of activities. Agarwal and Narain (2000) further argue to focus CDM strictly on

assisting developing countries in the transition to a non-carbon economy. Under such a scheme, only carbon-free energy would be promoted through CDM activities. However, as has been mentioned before (inter alia in chapter 3), it is doubtful whether in its present project form, CDM can contribute to a structural transition to a non-carbon economy in a lot of developing countries: apart from the fact that a structural reform of developing countries cannot be done on a project-by-project base, the CDM is not a sustainable development fund, but a market mechanism. It seeks fast and large returns on investment, with the result that CDM projects are very unevenly distributed geographically, and that the largest projects do not have sustainable development benefits. Even when CDM is reformed to sectoral, programme or policy CDM, it is unlikely that the geographical distribution will change substantially. Besides there are suspicions that unending disputes will surface about the meaning of additionality in sectors in turbulently developing economies. This may create an insecure environment for potential investors.

In order for the international carbon market to have an impact on investment decisions, there must be some assurance that there will be a value for emission reductions beyond 2012. Therefore, a clear signal on the longevity of the limitation and reduction targets is needed from policy-makers. In particular, the flow of investments through the CDM is likely to diminish significantly over the next couple of years unless there is a clear signal that emission reductions will have value after 2012. Clearly, it is difficult to provide much assurance concerning the final form and modalities of any post-2012 climate regime. A clear indication of willingness, however, from Parties to work towards maintaining a functioning carbon market beyond 2012 will be an important first step.

A final comment is a concern of caution. The Kyoto Protocol constitutes the first major experiment in IET. Yet some proposals for future commitments, as discussed in the building block on commitments and differentiation, place a great deal of reliance on the success of trading (e.g. by structuring an allocation system in order to induce large North-South financial transfers). Because of the untested nature of the IET, some caution is warranted. Achieving the positive results that have been demonstrated in domestic contexts will require competitive markets and other conditions that may prove elusive, especially within the confines of international treaty law where participation and compliance cannot be assured. In particular, effective monitoring, reporting, review, and compliance provisions are essential to the function of a trading system.

In conclusion, it can be stated that international emissions trading has been put forward by (originally Non-European) industrialised countries under the rationale for cost-effectiveness. Objection of developing countries was to a great extent based on ethical grounds. A first objection can be regarded as an environmental concern and is related to the concept of 'pollution rights' (Environment axis; Table 1). Tradable units are often referred to as allowances, because they 'allow' the 'owner' to emit a specified amount of greenhouse gases. In this sense, these allowances can be regarded as pollution rights allowing rich countries to buy their way out of reducing their own harmful emissions. Also, developing countries, based on the equity principle of responsibility, advocate against too much flexibility for fulfilling commitments through international transfer rather than domestic action. As global

climate change effects have their local origins mainly in the North, responsible action therefore has to be local in the first place, relieving the burden from other countries (Equity axis; Table 5.1).

Although these ethical objections are still ventured, CDM has recently raised a lot of enthusiasm with several developing countries. Big emitters as China and India as well as e.g. LDC countries, interested in channelling public and private sector investment towards their sustainable development, have repeatedly expressed their interest in attracting CDM projects (Economy and development axes; Table 5.1). In this context, it should be clear that the most lasting contributions from the developing countries will not come from their ability to cut emissions on the cheap, but from their ability to benefit from technological leapfrogging in long-term infrastructure. In this view, the carbon market should be a means rather than an end, and its success should be measured by how it assists countries in meeting their climate change and sustainable development commitments and priorities. The CDM is currently the only mechanism for developing country participation in the carbon market. There are doubts however on whether CDM as a market mechanism can contribute much to a structural transformation of economies, even when CDM is broadened from project-based to sectoral based.

Beside moral arguments, the demand for environmental effectiveness poses serious questions on the applicability and efficiency of emissions trading. For instance, the 'hot air' accumulated in the Eastern European Countries with Economies in Transition presents serious environmental concerns (Environment axis; Table 5.1). 'Hot air' is also felt as a threat to developing countries, as these cheap emission allowances decrease the possibilities for developing countries to enter the market via CDM. As developing countries are only eligible for CDM activity, they will face stiff competition for these funds essential to their developmental concerns.

Another environmental concern related to the project-based mechanisms JI and CDM is that of 'environmental additionality' (Environment axis; Table 5.1). Since any project to be credited is supposed to generate climate change benefits, which would not be available otherwise, it becomes crucial to draw a line between 'normal' and 'additional' projects. Because both the receiver and the investor countries have an interest in assuming an 'emissions intensive' business-as-usual scenario⁵¹, this procedure of defining baselines could well prove to be counterproductive for a country's search for sustainability.

5.3.5. Adaptation policy⁵²

It is becoming clear that regardless of how effectively precautionary measures are taken by the global community to limit anthropogenic greenhouse gas emissions, some degree of climate change is already unavoidable. Moreover, developing countries, which are least responsible, are considered particularly vulnerable to climatic changes. Here, vulnerability refers not only to the expected negative impacts of climate change in developing regions, but also to their limited capability to respond and cope with such negative effects ('adaptive capacity'). All this goes to say that addressing adaptation in

⁵¹ The more conventional the baseline chosen, the more additional funds or credits, respectively, can be recovered from the flexibility operation.

⁵² For an extensive discussion on adaptation issues, the reader is referred to Chapter 4 ('Adapting to unavoidable climate change').

a future climate policy framework is essential to developing countries because of both developmental and equity concerns.

Indeed, thinking in terms of 'vulnerability' makes clear that for developing countries adaptation is closely tied to their development. For example, most of the eight Millennium Development Goals, such as poverty reduction and environmental sustainability, are directly affected by climate variability and change. There is thus a clear need to mainstream climate policies and development and poverty reduction strategies (Development and Economy axis; Table 5.1). Although the rationale for mainstreaming climate and development is clear, this knowledge has thus far rarely led to the design of policies, programs or projects that bear these findings in mind. For example, current documents that guide development strategies in developing countries, such as national development plans and Poverty Reduction Strategy Papers (PRSP), pay negligible attention to climate change (Agrawala, 2004). Discussions on how this can be realised in a post-2012 climate architecture are ongoing. The five-year SBSTA programme of work on impacts, vulnerability and adaptation to climate change, agreed upon at COP 11 in Montreal, will be an important venue for furthering these efforts. This programme is intended to assist Parties in addressing methodologies, data and modelling, vulnerability assessments, adaptation planning, measures and actions, and integration into sustainable development. Up till now however, work has concentrated on gathering information from relevant sources. A more concrete starting point may be found in the National Adaptation Plans of Action (NAPA) for Least Developed Countries (LDC). The Marrakech Accords (COP 7) established a separate LDC work programme which includes the preparation of NAPAs to be funded by a newly created LDC fund (see below). NAPAs open up a channel for LDCs to inform the international community of their 'immediate and urgent' adaptation needs. According to the guidelines adopted at Marrakech, NAPAs should be guided by, amongst others, the principles of sustainable development and complementary approaches in the national development strategies of the LDCs. Countries are to recognise the local community as a main stakeholder and take into account current vulnerability and existing coping strategies at grassroots level to identify priority adaptation activities (rather than focussing on scenario based modelling in shaping long-term national policies).

Developing countries, because of their high vulnerability to climate change impacts, have particular concerns with respect to funding for adaptation. Three funds specifically designed to meet the adaptation needs of developing countries were created under the Marrakesh Accords: the Least Developed Countries Fund and the Special Climate Change Fund under the UNFCCC; and the Adaptation Fund under the Kyoto Protocol. Currently contributions are voluntary (apart from a 2% levy on CDM transactions for the Adaptation Fund) and, as a result, funds for assistance are negligible. Firm and regular financing under the Convention is needed to ensure the viability of these funds and to provide developing countries with a predictable source of adaptation funding. Developing countries therefore plea for mandatory contributions based on equity criteria such as responsibility (historical emissions) or capacity (ability to pay) in order to generate firm and regular financial resources at the high levels needed (Equity axis; Table 5.1). Besides, financing also could be provided through the establishment of agreed upon levies (such as proposed by Ott and Sachs on all market mechanisms; see above) or be leveraged from various insurance and risk transfer instruments. The latter serve to

reduce the financial risks associated with climate-related extreme weather events, and increase adaptive capacity by creating systems that allow for quick access to capital for reconstruction following a disaster.

To complement the environmental axis of our analysis framework, it could be mentioned that adaptation measures are also advocated for based on environmental concerns (Environmental axis; Table 1). It has e.g. been demonstrated that the creation of reserves to preserve endangered habitats and ecosystems of small islands will contribute to maintenance of biological diversity, while increasing the resilience of these systems to cope with climate change.

5.3.6. Technology policy

Technology is expected to play a crucial role in mitigating and adapting to climate change and achieving the ultimate objective of climate stabilisation. Meeting this long-term objective will ultimately require that, over decades or centuries, society reduces GHG emissions to near zero. To achieve the required reductions will require a significant transformation of the conventional technology used to produce and distribute energy, manufacture goods and provide transportation (Environment axis; Table 5.1).

While obvious reasons for including technology as a key building block in a future climate architecture can thus be found in environmental concerns, developing countries have, based on development concerns, repeatedly plead to include technology transfer as an essential element in a balanced climate policy. Technology transfer is critical in supporting their sustainable development efforts and can even facilitate their 'leapfrogging' into a future path of economic growth that is less harmful than the industrial revolution witnessed in the global North (Economy and Development axis; Table 5.1). In the context of the UNFCCC, much preparatory work in the area of knowledge and experience gathering has already been undertaken to promote technology transfer under article 4.5. In practical terms however, very little transfer of hard technologies has taken place, certainly not enough to begin decreasing carbon emission trends. The lack of progress within the international negotiations has certainly contributed to this state of affairs. The controversy stems from the differing perceptions of technology transfer: developing countries have wanted developed countries to facilitate technology transfer through increased financial and technical support; while developed countries, from an economic stance, have expressed an unwillingness to share their technologies without commercial benefit and have pointed to the need for incentives for private companies that own the technologies.

If a future climate regime is to take both the global environmental concerns and the developmental concerns of developing countries serious, it will need to find ways to support and enhance technology development, deployment and diffusion (DD&D) through actions additional to the present technology transfer activities under the UNFCCC regime. Technology agreements will thus form a critical component of any future climate regime, whether those agreements are negotiated within the UNFCCC or arise from outside initiatives such as the G8 Action Plan on Climate Change, Clean Energy and Sustainable Development and the Asia-Pacific Partnership on Clean Development and Climate. From an environmental point of view, however, many critics agree that an exclusively

technology focused approach is unlikely to provide the emission reductions required and that actions to promote technology DD&D will be most effective if they complement a credible, global commitment to reduce greenhouse gas emissions.

Technology cooperation to support DD&D will be a long-term approach, but in the short term it may serve as a complement to other efforts to reduce emissions and adapt to the impacts of climate change. To create the long-term effect, it will be necessary to start directing investment toward climate-friendly technologies in the short term and to persist with these investments thereafter. Equity concerns are at stake here, mainly related to the question who is going to bear these investments (Equity axis; Table 5.1).

A likely approach might be to develop a technology agreement that includes developed countries in the short term, with economies in transition and developing countries having to satisfy the same obligations when they meet a certain level of development (e. g. per capita welfare in purchasing power parity). For example, if developed countries adopted a technology agreement on a minimum share of renewable energy in energy production, it could create the 'critical mass' to encourage global diffusion of technologies. Such an agreement could consider obligations for new investments in the medium term (up to e.g. 2020) and over the longer term (up to e.g. 2050). Another viable post-2012 option would be an international R&D technology agreement, whereby developed nations commit to increase R&D spending and work in partnership with developing countries. An example is the Canadian government proposal that five per cent of R&D programs be done in partnership with developing nations (Anderson 2004).

5.3.7. Avoiding deforestation

A key issue, in particular with respect to developing countries, that has come up only recently deals with avoiding emissions from deforestation in developing countries. Following its presentation at the Seminar of Governmental Experts (SoGE, Bonn, May 2005) Papua New Guinea, with the support of a number of Latin American and African countries, requested the UNFCCC secretariat to include an agenda item at COP 11 entitled 'Reducing emissions from deforestation in developing countries: approaches to stimulate action'.

Deforestation is a hugely important topic within the context of climate change for obvious environmental reasons: tropical deforestation is responsible for 20 to 25 per cent of carbon dioxide emissions and has negative impacts on climate stability, biodiversity, local communities and indigenous peoples, air quality and other environmental and socio-economic goods and services (Environment axis; Table 5.1). The reasons behind deforestation in developing countries are plentiful, complex and differ both within and between countries and regions. They include poverty; the current system of perverse international market incentives for agriculture (cash crops), cattle ranching and timber production; illegal logging; forest fires; the creation of new settlements etc.

In a statement shortly before COP11, Papua New Guinea and Costa Rica note that although an important share of global GHG emissions originates from (tropical) deforestation, the UNFCCC does not provide by itself a mandate or incentive for addressing (i.e. reducing) these kinds of emissions.

Therefore, they stress the need for new approaches in this area, basically with the goal of accounting reduced deforestation rates as emission reductions. Moreover, they present two suggestions for moving forward: either to create a new free-standing Protocol to the UNFCCC or to make forest conservation activities eligible under the CDM.

Generally speaking, two options exist for undertaking and rewarding action to reduce tropical deforestation under a post-2012 climate regime: one where emission credits are generated in some way from actions and another where other incentives are provided. A scheme based on trading, however, would require robust, institutionally demanding criteria to ensure real, verifiable emission reduction from avoiding deforestation with a compliance system. Accounting forest preservation measures as emission reductions is not an easy task. Many issues remain to be resolved (definition of deforestation⁵³, data availability, establishing baselines, monitoring, uncertainties etc.) and discussions about this topic are ongoing.

Concerns on environmental additionality that have been voiced in the context of market mechanisms are also present here (Environmental axis; Table 5.1). A scheme based on emission credits from avoided deforestation should not allow industrialized countries to avoid deepening their current emission reduction commitments; tropical deforestation reduction efforts need to be additional to fossil fuel emissions reductions.

Besides obvious environmental benefits, avoiding deforestation presents economic opportunities to developing countries. By generating e.g. emission credits, avoiding deforestation could allow developing countries to enter the carbon market and generate significant income (Economy and development axis; Table 5.1).

Equity issues are also at stake here (Equity axis; Table 5.1). Any effort to reduce GHG emissions from deforestation should ensure a fair distribution of the responsibilities and possible benefits both between and within countries. Reducing GHG emissions from deforestation offers a unique opportunity to operationalise the principle of common but differentiated responsibilities: on the one hand it allows developing countries to enter the climate regime on a voluntary basis; on the other hand it allows for industrialized countries to financially participate in assuming its historical emission reduction responsibilities. Further, to ensure fairness at the international level, differences in the national extent of forest cover should be taken into account when developing policy approaches and methodologies. The possibility that large countries may benefit disproportionately from the mechanisms to be adopted or may impair their smooth operation should be of concern.

⁵³ E.g. to what extent temporary forest cover change (harvest activities) or illegal activities should be taken into account?

5.4. Conclusion

The picture that emerges from the preceding analysis on post-2012 climate policy is a very complex one: several key issues ('building blocks') have to be addressed, for each building block a multitude of possible approaches are on the table and throughout the whole debate, differing and sometimes competing concerns and interests of many different stakeholders play a role. The three axes analysis framework presented here suggests that most of the concerns and interests, both from developed and developing countries, can be grouped in three main categories: environment, economy and development, and equity. Narrowing the scope to developing countries brings three overarching concerns to the forefront: 'impacts and vulnerability', 'development needs' and 'historical responsibility for climate change'.

'Impacts and vulnerability' refers to the fact that, whatever measures are taken to mitigate climate change, some degree of climate change is already unavoidable and developing countries are believed to be impacted hardest and first, due to both their (sub-)tropical geographical position and their lack of adaptive capacity. This means that climate change is a real and present danger to them and points to the urgent need for climate policy to obtain a certain degree of awareness of the real and present vulnerabilities of people which will be affected by climate change. How this can be realised remains open but it might be envisaged as a more 'bottom-up' oriented approach focussing on the social vulnerability of individuals or groups to both existing climate variability and climatic change. This change in emphasis has already been noticed in the scientific debate concerning adaptation as described in Chapter 4. There, a shift from an abstract 'impacts and mitigation' context to a more concrete 'vulnerability and adaptation' context has been noticed. The same degree of awareness should be present throughout the whole climate policy debate and especially on the negotiation level. Besides the building block on adaptation, other building blocks address vulnerability related issues. A more concrete long-term environmental objective could e.g. be seen as an incentive for developed countries to tackle vulnerability and adaptation issues more effectively. Vulnerability concerns are also clearly present in discussions on technology transfer provisions (adaptation technologies) and on commitment types. The mentioned Sustainable Development Policies and Measure approach could for instance include policies that enhance adaptive capacity.

'Development needs' as a concern, although related to 'impacts and vulnerability', mainly stems from the fact that basic development concerns such as poverty eradication, human health, etc. are the first and overriding priorities for developing countries. Developing countries cannot be expected to redirect their limited resources away from these overarching concerns towards climate change mitigation. If climate change policy is to have some appeal to developing countries it will be so because it succeeds in aligning climate and development action. The economy and development axis of our analysis framework has repeatedly pointed towards the integration of sustainable development concerns and climate strategies (see Table 5.1) as the only viable way forward for developing countries. The need to take fully into account that basic economic and social development are the first priorities of developing country parties has been repeatedly voiced in the climate arena but still needs to be fully implemented. Developing countries need a way to fully benefit from technological

leapfrogging in long-term infrastructure. The recent appeal of the Clean Development Mechanism with developing countries points to their interest in channelling public and private sector investment. Options could be explored to expand and complement the CDM in a way that recognizes the differing national circumstances of developing countries. However, doubts have been expressed whether even a broadening of CDM from project-based to sectoral-based can contribute a lot to a structural transformation of developing countries' economies (see also chapter three).

Equity as a developing countries' concern is clearly related to the fact that developing countries bear a very low historical responsibility in climate change. Developing countries have repeatedly voiced this argument to refuse any form of binding commitments. While equity is overwhelmingly present in any discussion on burden differentiation, it may be clear from the equity axis of Table 5.1 that equity concerns are present in all building blocks of a future agreement. Indeed, the socio-economic vulnerability of the developing world demands that equity is included within all dimensions of the climate debate if it is to remain relevant to vulnerable groups and the governments of the countries within which they reside.

Also, different approaches for implementation of the building blocks have been discussed in general terms. From this, it has become clear that some approaches better than others take these concerns into account. As has been mentioned in the introduction of this chapter, climate policy can be regarded as an architecture in which different building blocks have to be included. Where the final architecture of a house should ideally reflect all the concerns and interests of the residents, the ideal climate architecture will have to find a balance between the differing concerns and interests for all nations to 'feel at home'. Therefore, to move forward, it is critical that climate change be approached in its entirety: issues related to adaptation, mitigation, market mechanisms, ... all have to be discussed and it is the way the entire framework, the final architecture, looks that will decide on the success of future climate policy. It will for instance be crucial that the post-2012 climate architecture that emerges from the negotiations is fair and 'perceived fair' by all parties (Ashton and Wang, 2003). Equity, therefore should not solely be associated with the differentiation of emission commitments but with the entire post-2012 architecture. Proposals for allocating commitments are only one building block of the final 'package deal' – albeit a crucial one. For example, the Montreal Protocol is widely perceived as equitable not just because country commitments were carefully differentiated, but also because industrialised countries ultimately compensated developing countries for phasing out ozone-depleting substances (Banuri et al., 1996). In the context of climate change, due attention for developing countries' vulnerabilities and development needs, e.g. in the form of funds for technology transfer, capacity development, clean energy and adaptation, will be especially important in crafting compromises that are both relevant and acceptable to developing countries.

Chapter 6. Belgian federal policy on climate change and developing countries

6.1. Current situation

6.1.1. Belgian federal climate policy: some institutional aspects

In Belgium, the process of the State reform led to the federalization of the State. Since 1980, the protection of the environment is largely a competence of the *Regions*. Air pollution matters for example, are now a responsibility of the regional authorities. The federal government, however, retains powers in a large number of areas (such as taxation, energy, transport, etc.) where it can intervene to combat air pollution through a variety of instruments.⁵⁴

However, because the problem of *climate change* is so complex and because many different sectors have an impact on GHG emissions, dealing with this problem requires intensive consultation and collaboration between different governments in different policy areas (infra, 6.1.1.1 and 6.1.1.2). In this regard, both the regional governments as well as the federal government have come up with policy responses. In 2004, the three regions and the federal government concluded a burden-sharing agreement (infra) for reducing GHG emissions. In this context, the federal government is taking measures which are supplementary to the efforts being made by the regions under their respective climate plans, in order to make sure that Belgium observes its international obligations. Because this research project is financed by the *federal* government, in this chapter, we will only focus on federal activities. We will not focus on emission trading because the allocation of emission rights is mainly a *regional* competence.

Section 6.1.1.1. gives a brief overview of how Belgium's input in international and EU climate change policy is organised. By contrast, Section 6.1.1.2. describes the organisation of the national climate policy. Section 6.1.1.3. gives an overview of federal actions so far. Figure 1 (infra) should clarify the current institutional and consultative structure.

6.1.1.1. Organisation of participation in international and EU Policy

The *Co-ordination Committee International Environmental Policy* (CCIEP)⁵⁵ is the principal body for co-ordinating Belgium's international environmental policies. This national committee is comprised of representatives of the federal and regional administrations and policy units, as well as the federal and regional ministerial cabinets. The CCIEP has created working groups for several environmental

⁵⁴ An example is "Products Policy". Source: <http://www.health.fgov.be>

⁵⁵ In Dutch: *Coördinatiecomité Internationaal Milieubeleid (CCIM)*. The CCIEP was established by the Cooperation Agreement of 5 April 1995 between the Federal State, the Flemish Region, the Walloon Region and the Brussels-Capital Region concerning international environmental policy, OJ 13 December 1995.

issues, such as the *Greenhouse Effect Co-ordination Group* for the climate change issue.⁵⁶

The debate on Belgium's position regarding climate change in international fora (such as the Conferences of the Parties and Subsidiary Bodies of the UNFCCC and KP) is being held in the *Greenhouse Effect Co-ordination Group* and several working groups that were created under its direction. For this matter, a consultation of the civil society has also been organised. The plenary CCIEP confirms the decisions of the working groups before taking them to an international level. Because of its EU membership, the position of Belgium in international fora is always consistent with the EU standpoint, which is prepared in the European Working Party International Environmental Issues – Climate Change (WPIEI(CC)).⁵⁷

To be complete, we have to add that matters of European Environment policy are formally the responsibility of the *Directorate General Co-ordination and European Affairs* (DGE) of the Federal Public Service Foreign Affairs, External Trade and Development Cooperation (X., 2006).⁵⁸ This means that DGE prepares the position of Belgium in the EU Council of Environmental Ministers. The initial preparation of this position, however, also takes place in the CCIEP.

Indispensable administrative and other support in these matters is being provided by the *Climate Change Section* of the *Directorate General Environment* of the Federal Public Service Health, Food Chain Safety and Environment (X., 2006). The Climate Change Section coordinates international climate policy through its role as the secretariat of the *Greenhouse Effect Co-ordination Group* of the CCIEP, thus providing vital co-ordination for all the parties concerned. The director of the Climate Change Section was also head of the Belgian Delegation during the last COP in Montreal. The Climate Change Section furthermore serves as a *National Focal Point* for climate policy, which is an interface with the relevant European and international institutions (such as the UNFCCC Secretariat) and a liaison with the regional climate services. Today, this central co-ordination role is even more important because environmental legislation, which is mainly transposed and implemented at the regional level, is to a large extent determined by international and European law. The Climate Change Section also coordinates the follow-up of European policy negotiations. For instance, the Section ensures the follow-up of the European Climate Change Programme (ECCP), i.e. the framework within which the EU develops its own policy for reducing GHG emissions.

6.1.1.2. Organisation of National Climate Policy

A cooperation agreement between the federal State and the three regional governments of 14 November 2002⁵⁹ established a *National Climate Commission* (NCC), which became operational at the end of 2003 (X, 2006). The Commission consists of four representatives of each of the Contracting Parties (i.e. the federal government and the regional governments), who are appointed by

⁵⁶ Established in its current form by the ICE in January 1997. A so called "CO₂-working group" had already been established earlier (1991).

⁵⁷ This standpoint is then defended by the EU presidency at the COP or SB.

⁵⁸ A cooperation agreement determines who represents Belgium in the EU Council.

⁵⁹ In Dutch: "Samenwerkingsakkoord van 14 november 2002 tussen de Federale Staat, het Vlaamse Gewest, het Waalse Gewest en het Brussels Hoofdstedelijk Gewest betreffende het opstellen, het uitvoeren en het opvolgen van een Nationaal Klimaatplan, alsook het rapporteren, in het kader van het Raamverdrag van de Verenigde Naties inzake Klimaatverandering en het Protocol van Kyoto".

their governments. The Commission carries several responsibilities.

First of all, it is responsible for the implementation, follow-up and revision of the *National Climate Plan 2002-2012*. Adopted in 2002, this plan contains, in an integrated manner, all existing federal and regional environmental policies and measures and refers to all sectors. A number of new federal measures that were approved in March 2004, will constitute the federal chapter of the National Climate Plan. A revision of the Plan was expected by the end of 2005, but is currently (February 2006) still in progress. The draft version of the Plan is prepared by a thematic working group⁶⁰ and adopted by the NCC. The final version of the Plan is adopted at the highest political level by the Enlarged Interministerial Conference for the Environment (ICE).⁶¹

Secondly, the NCC makes sure Belgium complies with its international *reporting obligations*. Several reports (e.g. National Communications, Reports on Demonstrable Progress, estimates and projections of GHG emissions, implementation and performance indicators for policies and measures under national programmes) are prepared in thematic working groups of the NCC.⁶² The preparation of the annual GHG emission inventory takes place in the Working Group Emissions of the CCIEP. Final adoption of all these reports is a matter of the NCC itself. Belgium's GHG Inventory 1990-2003 and the National Inventory Report 2005 are available on-line.⁶³

Thirdly, in the future, the NCC will fulfil the role of National Focal Point and Designated National Authority for the respective approval of JI and CDM-projects.⁶⁴ For the moment, this is merely a political decision: some issues regarding the role of the NCC with respect to content in the screening of JI/CDM-projects, remain to be solved.

Finally, the NCC can also play an advisory role towards the *Greenhouse Effect Co-ordination Group* of the CCIM.

The NCC is assisted by a permanent secretariat. For the moment, there is a transitional phase of one year in which the Presidency of the NCC is also responsible for holding the secretariat. This is currently (February 2006) the Flemish Region.

Again, support is being provided by the Climate Change Section of the Directorate General Environment. Previously, the Climate Change Section served as the interim secretariat for the NCC and still provides coordination for the drafting of different reports, especially with regard to harmonising methodologies, and developing relevant indicators. In addition, the Climate Change Section is responsible for setting up the *structures* that are necessary for the KP flexible mechanisms to work in Belgium: a national register (which records trade of emission credits/allowances and is part of the EU-system) and a national allocation plan (setting emission ceilings for various installations). According to its website, the Section is currently preparing the introduction of the system for KP emissions trading

⁶⁰ Working Group Policy and Measures of the NCC.

⁶¹ This conference is a specialised committee comprised of the Ministers for the Environment, the federal Prime Minister, the Regional Prime Ministers, the federal Minister for the Budget, the Ministers in charge of energy, transportation, taxation and development aid, and the Regional Ministers for the Economy. The 'regular' ICE deals with matters that necessitate intergovernmental cooperation to implement environmental policies. It also sometimes intervenes in matters of climate change policy, e.g. in November 2005 for the internal partition of Belgium's (voluntary) contribution to UNFCCC's Trust fund For Supplementary Activities.

⁶² Besides working groups for the preparation of reports, other thematic working groups have been installed e.g. for the development of a cooperation agreement for the implementation of flexible mechanisms.

⁶³ <http://www.klimaat.be/inventemis/inventaris8.html>

⁶⁴ In accordance with the Marrakech Accords (UNFCCC COP 7).

for credits generated by JI/CDM-projects.

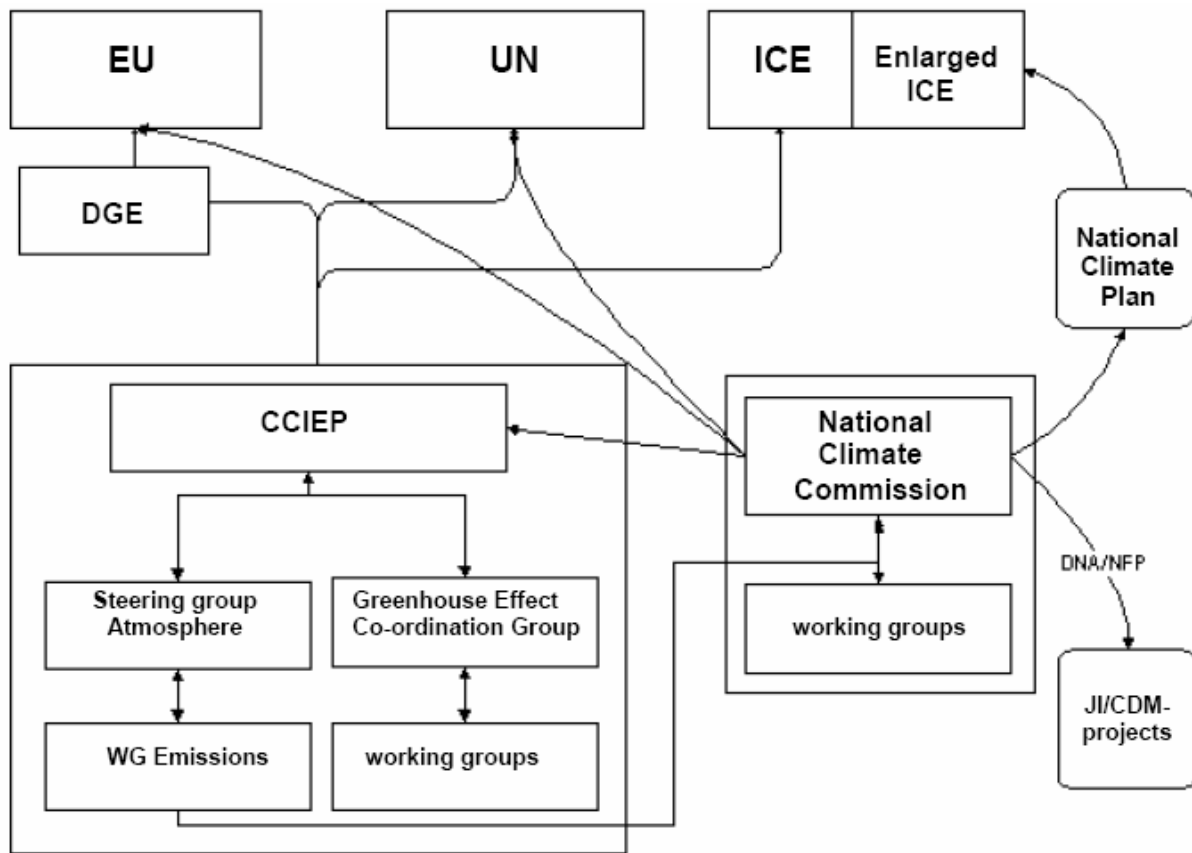


Figure 1. Schematic overview of the Belgian institutional structure regarding climate change policy. Source: Federal Public Service Health, Food Chain Safety and Environment, 2006.

The above consultative structure is indeed highly complex but consultation is indispensable in matters such as climate change and, at least to some extent, in a federalised state such as Belgium. The dynamics in the NCC and the CCIEP has always been relatively high, but at times difficult to maintain due to stretched resources of the small group of people who are working on climate change issues. Of course, this also depends on whether or not (highly) political issues are listed on the agenda of the different working groups and committees. In addition, it is not always easy to maintain involvement from other (non-environmental) departments, e.g. Energy and Transportation.

To be complete, we have to add that, under the co-ordination of the Federal Public Service Foreign Affairs, External Trade and Development Cooperation, an *informal meeting* called “Coor-multi” (Coordination of multilateral environmental policy) was created. Here, Belgian environmental positions in CSD, UNEP and OECD meetings are being determined.

6.1.1.3. Brief overview of federal actions so far⁶⁵

On a federal level, the first *National Programme to reduce CO₂ emissions*⁶⁶ was adopted in 1994.

⁶⁵ Source: <http://www.health.fgov.be>

Consistent with the provisions of the UNFCCC, its goal was to achieve a 5% reduction by the year 2000 compared to 1990 emissions. Unfortunately, the Programme did not reach the desired outcome. On the contrary, during this period CO₂ emissions increased with 4 %.

The coalition government that was formed after the elections of 1999 decided to give climate change high priority. The *Federal Plan for Sustainable Development 2000-2004* of 20 July 2000 advocated a multisectoral approach regarding energy, transport, industry, agriculture and waste-disposal to achieve the goals of the KP. A second Federal Plan for Sustainable Development 2004-2008 was adopted in September 2004. It reiterates the challenge of delinking economic growth from fossil fuel demand. However, these Plans merely have a guiding character.

In 2002, the aforementioned and separate *National Climate Plan (2002-2012)* was adopted. New federal measures that were adopted in March 2004 (infra), will constitute the federal chapter of the Plan. In November 2002, the aforementioned cooperation agreement between the federal State and the regional governments was concluded regarding the establishment of the NCC and the actual implementation of the National Climate Plan.⁶⁷

In March 2004, the three regions and the federal government concluded an internal burden-sharing agreement to divide the general reduction goal of 7,5% that Belgium committed itself to on a European level. This agreement sets out reduction goals for each region⁶⁸ and states that the federal government will take a number of *domestic measures* on the territory of the Regions that should lead to an additional reduction of 4,8 Mt CO₂. These domestic reductions were defined later that month at a special federal Council of Ministers in Raversijde. However, because these measures still were not sufficient in light of Belgium's reduction commitment, the federal government will supplementary purchase *emission allowances* generated by JI and CDM-projects for a total value of 12.3 Mt CO₂-eq. in the period 2008-2012.⁶⁹ The necessary financial resources will be drawn from the Kyoto Fund, which is operational since 2003 and receives € 25 million/yr.

6.1.2. Treatment of themes relevant for developing countries

Basically, Belgian federal climate policy consists of the domestic measures that were agreed upon in Raversijde in March 2004 and the federal commitment to purchase additional emission rights (supra). Apart from the attention that is being given to CDM-projects, federal climate policy does not focus on developing countries in particular. In a sense, this is logical, since its ultimate goal is to make sure Belgium complies with its international reduction commitments as part of the UNFCCC and the KP. It would therefore be up to the *Directorate General for Development Cooperation (DGDC)* of the Federal

⁶⁶ In Dutch: *Nationaal Programma ter vermindering van de CO₂ uitstoot*

⁶⁷ In Dutch: "Samenwerkingsakkoord van 14 november 2002 tussen de Federale Staat, het Vlaamse Gewest, het Waalse Gewest en het Brussels Hoofdstedelijk Gewest betreffende het opstellen, het uitvoeren en het opvolgen van een Nationaal Klimaatplan, alsook het rapporteren, in het kader van het Raamverdrag van de Verenigde Naties inzake Klimaatverandering en het Protocol van Kyoto".

⁶⁸ Walloon Region: 1990 emissions minus 7,5 %; Flemish Region 1990 emissions minus 5,2 %; Brussels-Capital Region emissions 1990 plus 3,475 %.

⁶⁹ 2,46 Mt CO₂-eq/jr.in 2008-2012.

Public Service Foreign Affairs, External Trade and Development Cooperation to take the lead in the debate on climate change and development. However, since several links exist between coping with climate change and development cooperation, an enhanced collaboration between the two administrations concerned could certainly prove to be useful.

Based on literature and several interviews with policy officials, in this section we investigate - from a climate change perspective - a number of policy themes that are relevant for developing countries.

6.1.2.1. Consultation between Development Cooperation officials and Climate Policy officials

The DGDC is a formal member of the Greenhouse Effect Co-ordination Group, but due to limited staff capacity with respect to the climate change issue, it is not always feasible to have a representative present at the meetings. In addition, one of the Ad hoc working groups that was created under the direction of Greenhouse Effect Co-ordination Group is called "*Climate Change and Development Cooperation*"⁷⁰ and as such would be the place where representatives from the relevant policy domains could formally meet. This working group still formally exists, but has not been convened for quite some time.⁷¹ Next to these official meeting places, a lot of informal contact exists between the policy officials. Due to recent demand from NGO's and the Climate Change Section of the Directorate General Environment, the ad hoc working group Climate Change and Development Cooperation will be revived and expanded in the near future. Officials from both policy domains stated their intention to start meeting again. It will be crucially important not to lose the momentum, because even though the Directorate General Environment is the driving force behind climate change policy, it does not have a clear mandate nor budget towards *developing countries*. The DGDC, by contrast, does and for that matter is an ideal partner.

With regard to the international level, since numerous (sub)themes concerning development exist within the climate change negotiations, it would be advisable to have more members of the DGDC present in the Belgian delegation at the UNFCCC COPs. This seems to be a matter of (political) choices regarding the distribution of the available financial and human resources within the DGDC.

In addition, some contacts between officials of the *Belgian Technical Cooperation* (BTC)⁷² and officials from the Climate Change Section have been initiated regarding the first JI/CDM-tender (infra). Since BTC is not always familiar with the climate change issue, these contacts focus primarily on information exchange. However, it will be examined if there can be a form of cooperation regarding the second JI/CDM-tender.

Finally, there is the role of the *National Delcredere Office*, Belgium's export credit agency, initially created by the Ministry of Economic Affairs.⁷³ In 2005, Greenpeace Belgium launched a report,

⁷⁰ Former Chair : Renata Vandeputte, DGDC.

⁷¹ Last meeting dealt with the Bonn Declaration.

⁷² The BTC is the Belgian development cooperation agency. As a public service provider, and on behalf of the Federal Public Service of Foreign Affairs, Foreign Trade and Development Cooperation, BTC supports developing countries by executing development project on the field. Thanks to this field expertise BTC also provides services on behalf of other national and international organisations contributing to sustainable human development. Source: <http://www.btcctb.org/>

⁷³ See: <http://www.ondd.be> and <http://www.delcredere.be> The National Delcredere Office is now a public autonomous financial body with a legal personality, carrying the guarantee of the government.

entitled 'Exporting pollution: the double standards of Belgian climate policies' (X., 2005a). The report basically states that Belgian domestic emission reductions under the KP will be seriously offset by the emissions of unsustainable energy projects in the South that are supported by the National Delcredere Office. The Delcredere Office replied that its legal task is to protect its clients against risks in connection with domestic and international commercial transactions and that it is dependent on the projects that are submitted. A number of draft bills have now been put forward in Parliament to reform the export credit agency, in a way that should support the promotion of clean and sustainable energy projects. Apparently for the moment, there does not seem to be a lot of consultation going on between Delcredere officials on the one hand, and Development Cooperation officials and Climate Policy officials, on the other hand.

6.1.2.2. Finance

According to its Fourth National Communication on climate change under the UNFCCC (X., 2006)⁷⁴, for the two year period 2003-2004, Belgium spent approximately € 46,8 million of general Official Development Assistance (ODA) on projects related to climate change⁷⁵, and an extra € 5,6 million of ODA on activities related to technology transfer (TT) and capacity building (CB) in the field of climate change.⁷⁶ The data on TT and CB are presented separately by request of the UNFCCC Secretariat and therefore have to be combined with the general ODA data to get the overall picture. As a comparison, for the two year period 2003-2004, Belgium's total ODA reached € 2 773,2 million. (X., 2004a and X., 2005b).

The DGDC, which is responsible for editing the chapter on financial resources, admits that the data in the report can be subject to criticism regarding accuracy. At this point, it is indeed very hard to identify contributions from ODA targeted at supporting specific efforts in the field of climate change. Within DGDC the so-called Rio markers are being used more often, but unfortunately until now not always to the full extent, making them a somewhat unreliable tool. The method that was used for compiling this chapter is based on a labour-intensive screening of projects according to codes used by the Development Assistance Committee of the OECD and, inevitably, some final assumptions about the contributions from ODA for specific efforts concerning climate change, had to be made. However, in 2005 the DGDC renewed its databases (which should lead to better data) and an internal campaign for better interpretation of each environmental action will be organised in 2006-2007, so improvement of the quality of the data is definitely expected. In 2003, the Report on the in-depth review of the third National Communication of Belgium already indicated that, for several reasons, a change on the reporting on funding and technology transfer was needed to bring the National Communication into full compliance with UNFCCC guidelines (Ndayizeye et al., 2003).

Turning back to the Fourth National Communication, the contributions on *TT and CB* are strikingly

⁷⁴ Chapter 7, Financial Resources and Technology Transfer.

⁷⁵ Table 7.4. combining columns "adaptation" and "mitigation"

⁷⁶ Table 7.5., column "adaptation". The column "mitigation" of Table 7.5 seems to be erroneous since it is an exact copy of the column "mitigation" of Table 7.4. Furthermore, the former column was not part of table 7.5 in the version of the Communication that was submitted to the UNFCCC Secretariat in December 2005.

low and for most part seem to go to the Flemish Interuniversity Council and Universities for environmental research and study programs, but in essence these figures constitute a rather conservative estimate. Basically, every project on the field includes TT or CB aspects, yet the difficult task is to assess the size of the climate change related part of each project. Therefore, in the following National Communications and with the aid of better databases, a part of the general ODA figures will be specifically attributed to TT and CB, yet the overall picture will remain largely unaltered.

The Belgian contribution to the *Global Environment Facility* (GEF) increased to almost € 10.5 million per year since 2003. 30% of that contribution is estimated to be used for climate change related issues. Belgian mitigation efforts in developing countries for example are almost entirely funded through the GEF.

Belgium is meeting its obligations deriving from international environmental treaties, such as the obligation to contribute to the core budget of the treaties. Belgium is also in compliance with the commitments made in 2001 by the EU and other industrialised countries in the *Bonn Political Declaration* (at COP6 bis) to provide US \$ 410 million in climate change funding per year between 2005 and 2008 (of which Belgium was supposed to provide around US \$ 12 million).⁷⁷ However, a current standard line of policy is that Belgium does not contribute to any newly created funds, for reasons of financial clustering and 'economy of institutions'. In the field of climate, this implies that for the moment Belgium is not contributing to the Special Climate Change Fund (SCCF – financing adaptation and mitigation projects) and Least Developed Countries Fund (LDCF – financing, inter alia, the preparation of National Adaptation Programmes of Action) under the UNFCCC nor is it contributing to the Adaptation Fund under the KP. In any case, it is rather striking that Belgium is thus not contributing to funds which are considered to be highly important in financing the fight against climate change.

Apparently, despite the 2002 Strategic Note on Environment, environmental issues in general are currently not a priority for Belgian Development Cooperation, while health care, education, gender etc. are.⁷⁸ Actually, this is not entirely surprising since the latter are issues that developing countries themselves often list as the top priorities and Belgian ODA is country-driven (i.e. dependent on the most urgent demands that developing countries are voicing themselves). Internally, the DGDC will try to use the so-called "attaché-days"⁷⁹ to increase the climate change awareness amongst its attachés.

The problem is not always merely a lack of financial resources. A recent federal law⁸⁰ stipulates that by 2010 Belgium should spend 0,7% of its GNI on ODA. In 2004, Belgium reached a spectacular 0.64% but this was largely due to an important cancellation of debt that could officially be calculated as ODA. The estimate for 2005 is 0.46%, which implies that Belgium, in 2010, will be obliged to spend almost twice as much on ODA compared to today. For the moment however, there are no concrete

⁷⁷ Funding to be counted under the Bonn Declaration can include: contributions to GEF climate change related activities; bilateral and multilateral funding additional to current levels; funding for the SFFC, LDC Fund and Adaptation Fund (infra); funding deriving from the proceeds of CDM.

⁷⁸ E.g. the Global Fund to Fight AIDS, Tuberculosis and Malaria (GATM) is receiving Belgian contributions, although this is also a newly created fund (2001). The authors, by no means, are implying that this funding is unjust or undeserved, but merely want to use this as an example that not all newly created funds are left unfunded.

⁷⁹ The "attaché-days" are an annual program of workshops and information sessions for (Belgian) attachés Development Cooperation who are stationed in Belgian embassies worldwide.

⁸⁰ Program Law of 24 December 2002, O.J. 31 December 2002, art. 458.

plans on how that extra money will be spent.

6.1.2.3. CDM

As mentioned before, the Clean Development Mechanism allows Annex I countries to carry out sustainable development projects in non-Annex I countries which locally reduce GHG emissions. In return, the investing countries can use the Certified Emission Reductions (CERs) that are generated by these projects, to comply with their own emission reduction obligations under the KP.

In accordance with the internal burden-sharing agreement (*supra*), the federal government has recently made a budget available of € 9,3 million for the purchase of an initial amount of emission reductions generated by JI and CDM projects via a *tender* process, which consists of two phases. In the *first phase*, which ended in September 2005, the candidates were selected on the basis of their Expression of Interest.⁸¹ From interviews we learned that language and other cultural barriers (e.g. the way in which people do business) sometimes have posed a problem regarding the selection of candidates. Countries where English is relatively well spoken certainly have an advantage, since the UNFCCC Secretariat is requesting all relevant documents to be submitted in that language. This creates a problem for some African countries. Possibly in the future, the second JI/CDM-tender (*infra*) might allow the use of French in the first phase of the process, but this hasn't been decided yet. 18 out of 36 expressions of interest successfully passed the first screening, including 6 JI projects and 12 CDM projects. The proposed CDM projects are located in Congo (hydroelectric plant), India (a renewable energy project, a biomass project and two fossil fuel switch projects), Kenya (redevelopment of hydroelectric plant), El Salvador (3 geothermal projects and a hydroelectric project), Vietnam (wind power) and Cyprus (wind power).⁸²

In the ongoing *second phase* of the tender process, the selected candidates (representing both JI and CDM-projects) are invited to submit an elaborated proposal. The items to be delivered with this proposal include a cover letter including the financial offer, the Project Design Document (PDD, with a fifth annex on environmental and socio-economic impacts⁸³) and Validation/determination Report⁸⁴, a letter of Social Responsibility⁸⁵, a CER delivery schedule, a business plan, an EIA (if applicable), a description of the environmental and socio-economic impacts of the project and finally a Host Country Letter of Approval. The federal government is contributing to the preparation costs that are made in this phase, by paying a minimum of € 20 000 (depending on the number of complete proposals received) to the Tenderer if he delivers a complete proposal and declares under oath that the project was not submitted before to other potential buyers.

Each selected candidate was given the opportunity to submit their elaborated proposal either before 10 April 2006 or before 12 September 2006. Six project proposals were submitted before the

⁸¹ The federal government assessed the suitability of the Candidates based on the expression of interest. Assessment criteria were: the technical and financial capacity to deliver the CERs, administrative criteria (trade register) and a number of exclusion criteria (defined by EU Directive 92/50).

⁸² The JI projects are located in New Zealand, Hungary, Germany and Russia.

⁸³ This additional fifth annex is not obliged by the UNFCCC, but demanded by Belgium.

⁸⁴ Both documents are regulated by the UNFCCC.

⁸⁵ In which the Tenderer declares that he complies with OECD guidelines for multinational corporations and ILO conventions.

10 April deadline, while five others are currently expected in September. This means that 11 projects at the most will be entering the final procedure (infra). So far, no elaborated project proposals for the CDM projects in Kenya nor Congo have been received, basically due to an underestimation of the preparation workload by the candidates and difficulties of local capacity. There is still good hope, however, that these candidates will submit their proposal before the second deadline.

In the tender, the federal government gives priority to (in order): (1) *energy efficiency projects*, (2) *renewable energy projects (excluding biomass)*, (3) *projects providing energy production by using clean, sustainably grown biomass (excluding waste)*, (4) *small scale projects*, (5) *projects in Africa, in a LDC and/or in a Partner country of the Belgian Development Cooperation*, and finally (6) *“other projects” including fossil fuel switch and methane recovery*. Projects concerning land use, land use change and forestry (LULUCF) and projects concerning nuclear energy were excluded in advance from entering the tender procedure.

As a first step of the final assessment, the submitted project proposals will be classified according to the above-mentioned six categories. Some projects can obviously be included in more than one category: e.g. a small-scale renewable energy project in Africa can be included in 3 categories, increasing its chance of eventually being selected.

Subsequently, all proposals are ranked within each of the six categories based on following award criteria: *sustainability*, *certainty of delivery* and *price for one CER*. To begin with, the projects are assessed⁸⁶ according to their contribution to the three broad components of *sustainable development* (Local/regional/global environmental sustainability; Social sustainability and development; Economic and technological development), compared to the baseline situation.⁸⁷ In part, this is a matter of self evaluation: the assessment will be based on the information provided in the project documents (in particular the fifth annex to the PDD). However, the Tenderer's claims are being assessed and, if proven correct, validated by the independent Designated Operational Entity (DOE) in the Validation Report. The maximum score to be obtained here is 50/100 and projects need to score at least 60%.

Regarding *certainty of delivery*, the candidates basically have to guarantee – both with respect to the financial and technological level of the project – that they will be able to deliver CERs. Basically, every project starts with the maximum amount of points (50/100) and points are subtracted relating to risks concerning the project entity, the project, the host country, etc. On this subject, the federal government is being advised by the National Delcredere Office (supra). Again, projects must score at least 60%.

The score that is obtained by adding up these two results (with a maximum of 100) is then combined with the *price* using the following formula: “[Price for one Kyoto unit] divided by [obtained score minus 40] = final score”.

Finally, the Proposals selected for further contract negotiation will be determined by choosing the first ranked projects out of each of the six categories, starting with category 1, up and until category 6. Once the latter category has been reached and as long as the budget allows, the next projects will be

⁸⁶ This methodology was based on the Gold Standard, an independently audited, globally applicable best practice methodology for project development. See: <http://www.cdmgoldstandard.org/>

⁸⁷ A potential problem with the “additionality” of the CDM-project is that it might disadvantage countries that already incorporate sustainable development policies in their laws. E.g. setting up a windfarm in a country where this is a standard policy, might not be considered additional, but rather as business as usual.

selected out of the second, third etc. ranked projects in the different categories, again starting with category 1 up and until category 6. In this way, a good mix of different projects should eventually be achieved, while at least favouring energy efficiency projects and renewable energy projects.

Negotiations on the actual Emission Reduction Purchase Agreements (ERPA) are currently (June 2006) expected to begin after August 2006. The federal government would consider the conclusion of (approximately) five contracts a minor success, given certain experiences from abroad.⁸⁸

In February 2006, the Belgian federal government decided to allocate € 50 Million for a second JI/CDM Tender and possible future investments in World Bank Carbon Funds. Which amount will go to the JI/CDM tender in particular has not been specified yet, but the second tender is planned for the autumn of 2006. However, policy officials confirm that the administrative workload that comes with organising a JI/CDM tender procedure should not be underestimated. Together with a lack of offered (eligible) projects, this might persuade governments in the future to invest in *carbon funds* instead. On the other hand, a JI/CDM tender generally has the double advantage that it is usually cheaper and that the Contracting government can determine its own priorities, and as such can stress the importance of the sustainability criteria. Still, there is an enormous variety of carbon funds and for instance the European Bank of Reconstruction and Development (EBRD) allows a (sustainability) screening of each individual project by possible investors. In this way, the investing government can buy emission credits that are generated by specific projects which meet its own sustainability criteria. The EBRD is however limited to those host countries that are located in its region (for CDM-projects: Armenia, Azerbaijan, Georgia, Kyrgyz Republic, FYR Macedonia, Moldova, Turkmenistan and Uzbekistan). In any case, if they are truly concerned about the sustainability level of the projects they finance via carbon funds, future investing governments will have to be observant not to lose control on the determination of the eligibility of project types.

For the moment, the federal government itself does not set up CDM projects in other countries, but it does offer financial support for the drafting of Project proposals (*supra*). It might prove useful for the DGDC to invest more in local capacity-building in order to attract foreign investors. It is clear that, for the moment, countries where industrial dynamics are low or simply don't have an energy infrastructure worthy of mentioning (e.g. small countries in Africa) fall by the wayside when it comes to attracting CDM-projects. Concerning the use of ODA for CDM, the Development Assistance Committee of the OECD decided in April 2004 that the value of any CERs received in connection with an ODA financed CDM project should lead to a deduction of the equivalent value from ODA (X., 2004b and X., 2004c). The possibility of counting as ODA funds used to purchase CERs is excluded. Capacity-building on the other hand, is permitted.

As a final remark, it is important to put the above-mentioned observations on the federal JI/CDM tender in its national context, in order not to lose the bigger (policy) picture. Although this federal tender is receiving very positive comments, one should bear in mind that it only deals with part of the climate change actions undertaken. The emission allowances that will be purchased by the federal government approximately only constitute 20% of the total amount of emission allowances that will be acquired by Belgium, i.e. taking into account Regional measures and emissions trading by the

⁸⁸ In Holland, 10 projects eventually were awarded a contract out of 78 Expressions of Interest.

industry.⁸⁹ But again, in this report, we have chosen to focus on the activities of the Belgian federal government.

It might, however, be interesting to briefly touch upon the *Flemish* JI/CDM tender.⁹⁰ The Flemish government focussed on achieving its emission reduction goals through *internal* reduction measures and considered the first call for JI/CDM projects in September 2004 as a 'test-case'. No concrete budget was initially made available for the purchase of CERs. Although the Flemish tender is comparable with the Federal one on a qualitative level (e.g. use of similar (sustainable) assessment criteria), only 11 projects were submitted. Of the four projects that were selected for further consideration, only one was a CDM project (landfill gas recovery in Chile). For the moment, however, the latter is the only project that is still in the running for the award of an emission reduction purchase agreement. There is no decision about a second Flemish JI/CDM tender.⁹¹

6.1.2.4. Biofuels

The federal government is currently promoting the use of biofuels via excise duty reduction (Program Law of 11 July 2005). A 2005 study on the transposition and implementation of Directive 2003/30/EC on the promotion of the use of biofuels or other renewable fuels for transport found that Belgian biofuel production capacity probably will not be able to supply a significant part of the quantities needed to reach the Belgian reference targets⁹² before 2007, and imports will therefore be required. Facilitating the use of biofuels in Europe might indeed create new markets in developing countries for biofuel production, which at first glance is a sheer positive development. However, NGOs and research teams are voicing concerns that large-scale plantations already negatively affect food production, water supply, biodiversity etc. in developing countries. In this context, it is advisable that the federal government would only promote biofuels that are generated in a sustainable way. Provisions concerning a federal tender to attribute quota for producers of biofuel were published halfway June 2006⁹³, but it seems that these mainly are intended to stimulate national or european production of biofuels.

6.1.2.5. Technology transfer

In general, the attention for technology transfer (TT) towards developing countries in Belgian federal ODA seems to be limited. As the figures in the above-mentioned Fourth National Communication indicate, the financial efforts for capacity building and technology transfer are rather low. In 2003 and

⁸⁹ Advice of the SERV and MiNa-Raad of 30 June 2006 on the Flemish Climate Policy Plan 2006-2012, Table 2, "use of flexible mechanisms by Belgium".

⁹⁰ Ministerial Decree of 9 November 2004, O.J. 18 November 2004 and Ministerial Decree of 24 February 2005, O.J. 31 May 2005.

⁹¹ Personal communication by ir. Liselotte De Vos, Flemish Government, dd. 7 June 2006.

⁹² According to Art. 4, 1° and 2° of the Royal Decree of 4 March 2005 (O.J. 8 March 2005), by 31 December 2005, 2% of all gasoline and diesel brought on the market had to be biofuel or another renewable fuel for transport. This amount has to increase linearly by 0,75% each year, reaching a 5,75% proportion by 31 December 2010.

⁹³ Law of 10 June 2006, O.J. 16 June 2006.

2004 together, Belgium spent € 5,6 million of ODA on activities related to technology transfer (TT) and capacity building (CB) in the field of climate change (X., 2006). Again, it should be noted that these figures have to be approached with much caution, because the share of the climate change component in programmes and projects is based on rough *estimates*.⁹⁴ Most contributions seem to go to the domain of agriculture.

In 2003, the UNFCCC Report on the in-depth review of the third National Communication of Belgium (Ndayizeye et al., 2003) found that a *specific budget line* for TT used to be available within the Belgian ODA, but that it had recently been dropped due to a decision to concentrate on five key areas: *agriculture and food security, health, education, infrastructure* and the *strengthening of society*.

Another possible explanation for the (general) lack of attention concerning TT could be that in recent years more ODA attention went to *poverty reduction*, which left themes such as TT – which has a more distinct *development* oriented character – out of the picture. For the moment, the *private sector* is becoming a more prominent partner in the distribution of technology. However, a mere market-based transfer of technology can hardly be considered as the ultimate solution for all developing countries and in any case will require a decent policy framework (including in the receiving countries with regard to quality standards etc.).

6.2. Belgian positions on post-2012

The political and scientific debate on the post 2012 regime has not yet gained momentum in Belgium. Several initiatives are worth noting, though. In September 2004, the Climate Change Section organised a workshop on "Future Climate Action beyond 2012". A large number of Belgian policymakers, socio-economic actors and foreign scientists participated. The goal was to identify a number of policy questions that were relevant for a future debate.⁹⁵ The Climate Change Section recently also issued a report on mid and long term GHG emission scenarios in Belgium.⁹⁶

At Flemish level, a working group on post 2012 has been set up within the process of the Flemish Climate Conference.

Furthermore, on request of the Federal Minister for the Environment, the Federal Council for Sustainable Development⁹⁷ (FRDO) has also issued a number of advices on "*a strategy to prevent climate changes post 2012*."⁹⁸ In a first advice, the FRDO states that it is necessary to involve all actors in the process of GHG emission reduction, including the US, but gradually also countries with a strong GHG emission increase, such as China, Brazil or Mexico. Obviously, the industrialised countries carry a historical responsibility in this matter. Therefore, they must accept the bulk of the emission reductions and facilitate the transfer of their technologies to the South. A continued effort will be needed to allow developing countries to develop themselves according to their own priorities in a

⁹⁴ E.g. "A factor of 50% is used to calculate the contribution to climate change"

⁹⁵ See: <http://www.klimaat.be/nl/studieDag2012.html>

⁹⁶ See: <http://www.klimaat.be/nl/studiePost2012.html>

⁹⁷ Federale Raad voor Duurzame Ontwikkeling - FRDO

⁹⁸ Advices dd. 26 November 2004, 8 July 2005 and 25 November 2005. Available on <http://www.frdo.be>

way that is in line with the principles of sustainable development. Nevertheless, countries that are currently experiencing a rapid process of industrialisation, should - fast but gradually - be convinced to comply themselves with a scenario that controls their emissions.⁹⁹ Energy efficiency goals could prove to be a solution in this regard, especially if these countries could benefit from technology transfer and financing. In a second advice, the FRDO reiterates this theme by stating that the industrialised countries should stimulate the research & development of technologies that can be applied in developing countries and countries in transition, through development aid, international organisations, a sectoral approach, flexible mechanisms and their terms of use, etc., with the ultimate goal of globally achieving maximum GHG emission reductions. In a third and final advice, the FRDO asks that Belgium's policy regarding development cooperation pays more attention to the theme of climate change, both in actions of capacity building in developing countries and in the elaboration of concrete projects with partner countries. To achieve this, the FRDO demands that the necessary human and financial resources are provided.

However, in general the concerns and interests of developing countries have hardly been discussed, nor has an analysis been made of where and how Belgium can or should take these into account. In this last section of this chapter, a few lines of thought are opened on how this could happen.

6.2.1. Mainstreaming of adaptation in development cooperation

Since developing countries have pushed adaptation as one of the main themes in international climate negotiations, awareness had grown of the links between adaptation and development. Climate change threatens to undermine all previous and future development efforts through disruption of ecosystems on which people rely for their livelihoods (agriculture, forestry, fisheries), impacts on human health, impacts of extreme weather events (droughts, storms) etcetera. (see also chapter 4 on adaptation, and specific parts of chapter 2 and 5). This immediately implies that all development aid threatens to be wasted as well when potential climate change impacts are not taken into account.

In April 2006, the OECD Development and Environment Ministers met in Paris to discuss how aid programmes can be used to help developing countries reduce their vulnerability to climate change.¹⁰⁰ In a final *Declaration on Integrating Climate Change Adaptation into Development Co-operation*¹⁰¹, they admitted “*that adaptation to climate change is not a “stand alone” agenda*” and that this issue has to be incorporated “*into development policy-making and planning, including in the context of national plans, such as Poverty Reduction Strategies*”. The Ministers also expressed their understanding that “*adaptation to climate change will often be synergistic with efforts to combat other global environmental problems, such as desertification and loss of biodiversity*”. For these and other reasons, they formally declared that they will work to improve the integration of climate change

⁹⁹ According to some studies, a business as usual scenario will lead to an increase of DC emissions of from 30% to over 50% between 1990 and 2030 (European Commission, 2003).

¹⁰⁰ See: <http://www.oecd.org/epocdacmin2006>

¹⁰¹ Available at: <http://www.oecd.org/dataoecd/44/29/36426943.pdf>

adaptation in development assistance and development planning, both within their own development co-operation agencies and in activities undertaken with partner countries.¹⁰² Entry points for this integration include country assistance strategies, sectoral policy frameworks, PRSP's, long-term investments, technical consultations and sector reviews, and strategic and project-level environmental impact assessments. Funding could be provided for implementation of National Plans for Adaptation (NAPA's).

This call for action should provide a new stimulus for Belgian policymakers, and in particular the Directorate General for Development Cooperation (DGDC) and the Belgian Technical Cooperation (BTC) to start integrating climate change concerns into development cooperation, because until now this has been a non-issue. The Law of 25 May 1999 defines the sectors (basic health care, education, agriculture and food security, basic infrastructure, conflict prevention) and cross-sectoral themes (gender, environment, social economy) on which Belgian development cooperation will be focused. Almost all of these can be affected by climate change. Investments in the different sectors should be made "climate proof", in the sense that e.g. investments in agricultural systems or in building of infrastructure are done in such a way that they are made resistant to climate change impacts. As is also stated in Belgium's Federal Plan for Sustainable Development 2004-2008, Belgium should support its partner countries in drawing up national plans which treat climate change as a transversal theme, and Belgium can actively bring up the theme in dialogues on PRSP's or in multilateral forums of donor countries.

6.2.2. Mainstreaming of mitigation

While currently a lot of attention is being paid to mainstreaming adaptation, the discussion in chapter 3 has made clear that this is an absolute necessity for mitigation as well, if developing countries are to have a meaningful contribution to controlling GHG emissions and climate change. Essentially, so-called leapfrog technologies should be promoted by switching funding and investments from obsolete fossil fuel technology to high-efficiency fossil technologies and renewables. Other efficient technologies in the field of e.g. transport and industrial processes are also important, as well as practices of sustainable agriculture and forestry. On the level of bilateral cooperation, it could be investigated in how far projects and programs are currently taking climate issues (and sustainability issues) into account, and how these could be integrated. The same holds true for programs from multilateral donors (where Belgium can raise its voice), in particular for the integration of climate and sustainability issues in e.g. Poverty Reduction Strategies, national development plans etcetera. An avenue worth of research are certainly Foreign Direct Investments (FDIs). Some possibilities are discussed in the following paragraphs, since mitigation is obviously linked to technology transfer (6.2.5), but also to CDM (6.2.4.) and deforestation (6.2.6.).

¹⁰² The partner countries of the Belgian development cooperation are Algeria, Benin, Bolivia, Burundi, DR Congo, Ecuador, Mali, Morocco, Mozambique, Niger, Palestine, Peru, Rwanda, Senegal, Tanzania, Uganda, Vietnam, South-Africa

6.2.3. Funding

Adequate and predictable revenue streams are essential for developing countries, either if they want to enhance their adaptive capacity, or if they want to reorient their economies in a more sustainable and low-carbon direction. Most analyses agree that new and additional funding is essential to reach this dual goal. Under the current climate regime, three funds were created, mainly to finance adaptation: the Adaptation Fund and Least Developed Countries Fund are solely meant for adaptation activities, the Special Climate Change Fund can be used for mitigation and adaptation. As has been remarked above, DGDC does not contribute to these funds, but fulfils its commitment of the Bonn Declaration – where Belgium was assumed to provide around US \$ 12 million of the total of US \$ 410 million – through contributions to the GEF. It is remarkable that Belgium negotiated the funds during its presidency of the EU, but does not contribute to them directly. Since after 2012 more funding will be necessary, it may also be necessary to reopen the discussion on this line of policy.

Strict climate-related funding under the UNFCCC is dwarfed in comparison with the financial streams in ODA and FDI, which amount roughly to US \$ 50 billion and US \$ 300 billion respectively. If climate concerns could be mainstreamed in these streams, as suggested above, consequences could be high. Purely on Belgian level, the Program law of 24 December 2002 stipulates that by 2010 Belgium should spend 0,7% of its GDP on ODA, which implies spending almost twice as much on ODA compared to today. Considering the fact that climate is almost absent in current development cooperation, it should be discussed how, apart from mainstreaming, part of this budget can be allocated to the huge needs in adaptation and mitigation in partner countries.

6.2.4. CDM

Belgium has received positive comments for its federal CDM tender, because it explicitly tries to incorporate sustainable development criteria in the selection of projects. Also the Flemish tender has tried to incorporate sustainability concerns. Since developing countries expect CDM to contribute to low-carbon economies, these kind of CDM projects can have an impact in this direction. As has been discussed in chapter 3, however, expectations about contributions of a project mechanism such as CDM to restructuring economies, should be realistic.

Since in a lot of countries the capacity to develop CDM projects is low, DGCD and BTC could probably play a role in local capacity building, and thus indirectly in building a more sustainable economy. This might also help in changing somewhat the geographical distribution of CDM projects. While the OECD excludes the possibility of purchasing CERs with ODA, capacity building on the other hand, is permitted.

It seems obvious that post 2012 CDM will be reformed, institutionally and in scope. Already now, forms of programme CDM are emerging, and the discussion on sectoral CDM cannot be avoided. With deforestation surfacing as a new topic, the inclusion of LULUCF activities in the Belgium CDM tender may surface again, also in view of the fact that several LDC's can have a meaningful contribution

exactly in this sector. Belgium itself will have to build capacity on the broadened CDM discussion, not only to follow the negotiations, but also to prepare its involvement in these forms of CDM. Capacity building should be interpreted broadly: within the administration, stakeholders, private sector¹⁰³.

Purchasing of CERs through federal or regional tenders is only part of the story. These are expected to contribute only 20% to 25% of emission credits needed by Belgium. The rest could be bought through carbon funds of e.g. the World Bank or the European Bank of Reconstruction and Development (EBRD). Again referring to the discussion in chapter 3, it is obvious that a major part of CERs which are expected to come into the market flow from CDM projects which have no or very limited sustainability benefits. If the Belgian federal level and the regions are serious about contributing to sustainable development, the criteria for purchasing through carbon funds should be made explicit and publicly discussed.

6.2.5. Technology transfer

Real and visible technology transfer is one of the important demands of developing countries, for mitigation purposes as well as for adaptation. As has been argued above, if developing countries are supposed to follow a low emission path in order to contribute to the global efforts in preventing dangerous climate change, they are badly in need of efficient and sustainable technologies. If Annex I countries urge them to take this road, Annex I will also have to be serious about technology transfer. However, technology transfer is no issue in Belgian policy. Climate change related technology transfer and capacity building is virtually absent in development cooperation; there is no capacity in Belgium itself; there is no consultation on the issue, either within the administration or with stakeholders and the private sector. Of course, TT is not a competence restricted to development cooperation. Moving ahead will mean bringing other administrations, stakeholders and private sector around the table. One partner should be the National Delcredere Office, the export credit agency. Research from Greenpeace Belgium showed that since the Kyoto Protocol (1997), the Office awarded export credits for projects that over their life cycle will emit cumulative emissions of 1.324,1 million ton CO₂, which is more than 20 times what Belgium will reduce under the KP. On the other hand, not one project on renewable energy has been granted export credits.

6.2.6. Deforestation

Deforestation is a new theme in the climate negotiations, but it has been an integral part of the sustainable development agenda since the 1990s. It will therefore be necessary to look for synergies between what happens under the UNFCCC and in other forums, such as the activities under the umbrella of the Biodiversity Convention. Keeping in mind the difficult discussions on sustainable forestry over the last 15 years, UNFCCC activities on avoided deforestation might well have to be

¹⁰³ However, see also the critical remarks on sectoral CDM in chapter 3.

framed within a broader international policy framework on forests. Climate policy makers will have to seek cooperation with experts and stakeholders in forestry and biodiversity, including the large populations in the South which depend on forests and forest services for their livelihoods. At Belgian level, it should be studied which activities cause deforestation in the South and how climate policy and other policies can have an impact here.

6.2.7. Capacity building at Belgian level

What is clear from the discussion so far, is that more capacity building at the Belgian level is needed on concerns and interests of developing countries, and on how these can be translated in policy deeds. This will have to take several forms.

One necessity is to strengthen the internal organisation and coordination in order to start the mainstreaming of climate issues in development cooperation, but also in fields such as technology transfer. Taking this task seriously, will also demand more resources, amongst others in the form of personnel.

Better understanding the issues at stake (with policy makers, civil servants and civil society) in order to better formulate policies will also be necessary. The public consultations on post 2012 which have been set up are a good start and should be continued. Understanding could be deepened by research on the broad and worldwide political aspects of the post 2012 discussion (and not just the economic-technical aspects in a restricted federal or regional context, as is know the case).

6.2.8. What Belgium (and the EU) should not do

It is the honest belief of a lot of developing country analysts and policy-makers that industrialised countries first have to prove that high welfare levels are compatible with low emissions, before developing countries can be convinced to take the same path. And it is their honest belief that the formidable task for developing countries of switching to a low-carbon development path while simultaneously adapting to unavoidable climate change, cannot be done without support from resources and technologies of the North. In the heat of negotiations, Annex I and non-Annex I sometimes start perceiving each other as the one to be outwitted and finally beaten. In the harsh reality of power politics and vested interests at global level, this cannot be completely avoided. Still simultaneously, negotiators and stakeholders involved in the negotiations have since months been pleading for the creation of “a climate of trust”, in order to be able to build the post 2012 regime.

In this light, Belgium should avoid not honouring its commitments, be it on the level of emission reductions or funding. The Federal Council for Sustainable development has in a recent advice expressed its deep concern that Belgium might not reach its reduction target, and the grave consequences attached to it. It has also pointed at the lack of harmonisation, integration and coordination in Belgian climate policy (federal and regions). From the analysis above, it has further

become clear that Belgium is inadequately honouring its commitments in such fields as finance and technology transfer. Building credibility and a climate of trust for post 2012, and demanding commitments from developing countries, becomes difficult in that way. Furthermore, this is not only the case for Belgium, but holds true for several EU countries: inadequately fulfilling commitments in the fields of finance and technology transfer, and alarming signals that the EU might miss its climate change mitigation target for 2008-2012.

All in all, the issues discussed in the previous paragraphs should not just be considered as a burden to industrialised countries, but as essential ingredients in the development of a post 2012 climate regime. In the end, without active support and engagement from developing countries, it will be impossible to construct a post 2012 regime and thus to move forwards towards the goal of preventing dangerous climate change.

Bibliography

Achard, F., Belward A.S., Eva H.D., Federici S., Mollicone D., Raes F. (2005), "Accounting for avoided conversion of intact and non-intact forests. Technical options and a proposal for a policy tool". Available at: http://www.tem.jrc.it/EU_development_policy/activities/Avoiding_Deforestation_Proposal_JRC_COP11.pdf

Agarwal, A., Narain, S., (1991), *Global Warming in an Unequal World*, Centre for Science and Environment, New Delhi.

Agarwal, A., Narain, S., Sharma, A. (1999), *Green Politics. Global Environmental Negotiations 1*, Centre for Science and Environment, New Delhi.

Agrawala, S. (2004), 'Adaptation, Development Assistance and Planning: Challenges and Opportunities', in *IDS Bulletin* 35, p. 50.

Aldy, J.E., Barrett, S., Stavins, B.N. (2003), 'Thirteen plus one: a comparison of global climate policy architectures', in *Climate Policy* 3 (2003), p. 373-397

Anderson, G. (2004), 'Markets, Geopolitics, Energy Security and Sustainability', lecture at *19th World Energy Council Congress*, Sydney (Australia), September 2004

Arnell, N.W., Cannell, M.G.R., Hulme, M., Kovats, R.S., Mitchell, J.F.B., Nicholls, R., Parry, M.L., Livermore, M.T.J., White, A., 2002. The consequences of CO₂ stabilisation for the impacts of climatic change, in *Climatic Change* 53, 413–446.

Ashton, J., Wang, X. (2003), *Equity and Climate: In Principle and Practice*, Working Draft, Pew Center on Global Climate Change.

Azar, C., Holmberg, J., (1995), 'Defining the generational environmental debt', in *Ecological Economics* 14 (1995), 7-19.

Banuri, T. and Weyant, J., (2001), 'Setting the Stage: Climate Change and Sustainable Development', in Metz, B. et al. (Eds), *Climate Change 2001: Mitigation*, Contribution of Working III to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge

Banuri, T. et al., 1996, 'Equity and social considerations' in *Climate Change 1995: Economic and social dimensions of Climate Change*, J.P. Bruce, L. Hoesung and E.F. Haites, eds. Contribution of WG III to the 2nd Assessment Report of the IPCC. Cambridge University Press.

Barnett, J., Dessai, S. (2002), Articles 4.8 and 4.9 of the UNFCCC : adverse effects and the impacts of response measures, in *Climate Policy* 2 (2002), 231-239.

Baumert, K.A., Herzog, T., Pershing, J. (2005), *Navigating the Numbers. Greenhouse Gas Data and International Climate Policy*, World Resources Institute, Washington.

Beg, N., Morlo, J.F., Davidson, O., Afrane-Okesse, Y., Tyani, L., Denton, F., Sokona, Y., Thomas J.P., La Rovere, E.L., Parikh, J.K., Parikh, K., Rahman, A.A. (2002), 'Linkages between climate change and sustainable development', in *Climate Policy* 2 (2002), p. 129-144

Berk, M.M., J.G. Van Minnen, B. Metz, and W.R. Moomaw, 'Keeping our Options Open: A Strategic Vision on Near-Term Implications of Long-Term Climate Policy Options.' Concise summary of the results of the Global Dialogue of the COOL-project (Climate OptiOns for the Long term). Bilthoven, Netherlands: RIVM.

Bhandari, P. (2004), 'India, climate change and sustainable development', in *Beyond Kyoto: post 2012*, Pelangi, Jakarta, p. 11-15 (http://www.pelangi.or.id/publikasi/2004/beyond_2012.pdf)

- Bodansky, D., 2003, 'Climate Commitments: Assessing the Options', in J. E. Aldy et al., *Beyond Kyoto: Advancing the International Effort against Climate Change*, Pew Center on Global Climate Change
- Bodansky, D., Chou, S., Jorge-Tresolini, C. (2004), *International Climate Efforts Beyond 2012: A Survey of Approaches*, Pew Center on Global Climate Change, Arlington
- BP, 1997, 'The Brazilian Proposal'. FCCC/AGBM/1997/MISC.1/Add.3
- Bradley, R., Baumert, K.A. (2005), *Growing in the Greenhouse. Protecting the Climate by Putting Development First*, World Resources Institute, Washington D.C.
- Brooks, N. (2003) *Vulnerability, Risk and Adaptation: A Conceptual Framework*. Working Paper 38, Tyndall Center for Climate Change Research, Norwich, UK.
- Brownlie, I. (1979), *Principles of Public International Law* (3rd Ed.), Oxford University Press, New York.
- Burton, I., Huq, S. Lim, B., Pilifosova, O., and Schipper, E.L. (2002), 'From impacts assessment to adaptation priorities: the shaping of adaptation policy'. *Climate Policy* 2, 145-159.
- Byrne, J., Glover, L., Inniss, V., Kulkarni, J., Mun, Y.I., Toly, N., Wang Y.D. (2002), *An Equity and Sustainability-Based Assessment of the Kyoto Protocol*. Available at: [http://www.keei.re.kr/web_keei/allim.nsf/0/547189077ea1724b49256c8800083750/\\$FILE/Byrne_2.pdf](http://www.keei.re.kr/web_keei/allim.nsf/0/547189077ea1724b49256c8800083750/$FILE/Byrne_2.pdf)
- Cazorla, M., Toman M. (2000), International equity and climate change policy, in *Climate Issue Brief No. 27*, (2000). See: <http://www.rff.org>
- Chandler, W., Schaeffer, R., Dadi, Z., Shukla, P.R., Tudela, F., Davidson, O., Alpan-Atamer, S. (2002), *Climate Mitigation in Developing Countries. Brazil, China, India, Mexico, South Africa, and Turkey*, Pew Center on Global Climate Change, Arlington
- Climate Action Network (2003), *A Viable Global Framework for Preventing Dangerous Climate Change*, CAN Discussion Paper for COP-9 (Milan, Italy).
- Cohen, S., Demeritt, D., Robinson, J., Rothman, D. (1998), 'Climate change and sustainable development: toward dialogue', in *Global Environmental Change*, Vol. 8, No. 4, pp. 341-371
- Corfee-Morlot, J., Höhne, N. (2003), 'Climate change: long-term targets and short-term commitments', in *Global Environmental Change* 13, 277
- Cosbey, A., Parry, J-E, Browne, J., Dinesh Babu, Y., Bhandat, P., Drexhage, J., Murphy, D. (2005), *Realizing the Development Dividend: Making the CDM Work for Developing Countries. Phase 1 Report, Pre-publication Version*, International Institute for Sustainable Development
- Dave, R., Heller, T., Kok, M.T.J., Shukla, P.R. (2005), *Financing Integrated Development and Climate Strategies. Outcomes of workshop – Development and Climate Programme*, Netherlands Environmental Assessment Agency, MNP Report 500019002/2005
- Davidson, O., Halsnaes, K., Huq, S., Kok, M., Metz, B., Sokona, Y., Verhagen, J. (2003), 'The development and climate nexus: the case of sub-Saharan Africa', in *Climate Policy* 3S1 (2003), S97-S113
- Den Elzen, M.G.J., Berk, M.M., Lucas, P., Eickhout, B. and Van Vuuren, D.P. (2003). *Exploring climate regimes for differentiation of commitments to achieve the EU climate target*, RIVM Report no. 728001023, National Institute of Public Health and the Environment, Bilthoven, the Netherlands
- Den Elzen, M., Meinshausen, M. (2005), 'Multi-gas emission pathways for meeting the EU 2°C climate target', paper presented at the *Avoiding Dangerous Climate Change Conference*, MET Office, Exeter, UK, 1-3 February 2005

- Den Elzen, M. et al. (2005), 'Analysing countries' contribution to climate change: scientific and policy-related choices', *Environmental Science & Policy* 8 (2005), 614–636.
- Depledge, J. (2002). 'Climate change in focus: The IPCC Third Assessment Report'. *Briefing Paper* 29. Royal Institute of International Affairs. London. <http://www.riia.org/research/eep/climate.html>
- Dessai, S., Adger, W. N., Hulme, M., Turnpenny, J., Köhler, J. and Warren, R., 'Defining and experiencing dangerous climate change', *Climate Change* 64 (2004) 11-25
- Downing, T.E., Munasinghe, M., Depledge, J. (2003), 'Editorial. Special Supplement on Climate Change and Sustainable Development', in *Climate Policy* 3S1 (2003), S3-S8
- Edmonds, J. and Wise, M., (1999), 'Exploring a Technology Strategy for stabilising atmospheric CO₂', in Carraro C.(ed), *International Environmental Agreements on Climate Change*, Kluwer Academic Publishers, Dordrecht
- European Commission (2003), *World energy, technology and climate policy outlook 2030*, DG Research of the European Commission, 2003.
- Federale Raad voor Duurzame Ontwikkeling (2004), *Advies inzake een strategie ter voorkoming van klimaatveranderingen na 2012*, Brussel
- Federale Raad voor Duurzame Ontwikkeling (2005), *Tweede advies inzake een mondiale strategie ter voorkoming van klimaatveranderingen na 2012*, Brussel
- Figueres, C. (2006), 'Sectoral CDM: Opening the CDM to the yet Unrealized Goal of Sustainable Development', in *International Journal of Sustainable Development Law and Policy*, Vol. 2, No. 1, March 2006.
- German Advisory Council on Global Change (2003), *Climate Protection Strategies for the 21st Century; Kyoto and Beyond. Special Report*, Berlin
- Grobben, P. (2006), *Zendingsverslag SB 24: 15-26 mei, Bonn, Duitsland*, Internal document, 5 p.
- Gupta, J. (1998). *Encouraging developing country participation in the climate change regime*, Institute for Environmental Studies (IVM), Vrije Universiteit, Amsterdam, The Netherlands.
- Gupta, S, and Bhandari, P.M., 'An effective allocation criterion for CO₂ emissions', *Energy Policy* 27 (1999) 727-736))
- Hare, W., *Assessment of knowledge on impacts of climate change – Contribution to the specification of Art. 2 of the UNFCCC*, WBGU, Berlin, 2003.
- Halsnaes, K., Olhoff, A. (2001), *Proceedings from the Sustainable Development and Climate Change Workshop*, Paris 24-25 October 2001, UNEP
- Halsnaes, K.; Shukla, P. (2005), *Mainstreaming International Climate Agenda in Economic and Development Policies*, UNEP Riso Centre, Roskilde
- Heller, T., Shukla, P.R. (2005), 'Financing the Climate-friendly Development Pathway (with Illustrative Cases from India)', in Dave, R., Heller, T., Kok, M.T.J., Shukla, P.R. (2005), *Financing Integrated Development and Climate Strategies. Outcomes of workshop – Development and Climate Programme*, Netherlands Environmental Assessment Agency, MNP Report 500019002/2005
- Henry D. Jacoby; Ellerman, A.D., 'The safety valve and climate policy', *Energy Policy* 32 (2004) 481-491
- Höhne et al., (2003), *Evolution of commitments under the UNFCCC: Involving newly industrialised economies and developing countries*. Research Report 201 41 225. UBA-FB 000412

IPCC (2001a), *Climate change 2001: Impacts, Adaptation and Vulnerability*, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge

Huq, S. and Reid, H. (2004) Mainstreaming Adaptation in Development, *IDS Bulletin*, Vol 35(3), 15-21

Huq, S.; Rahman, A., Konate, M., Sokona, Y., and Redi, H. (2003), *Mainstreaming Adaptation to Climate Change in LDCs*, London:IIED

IPCC (2001a), *Climate Change 2001: Synthesis Report. Summary for Policymakers*, IPCC

IPCC, (2001b), *Climate Change 2001: Mitigation*, A Report of the Working Group III of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge

Jacoby, H., Schmalensee, R. and Wing, I., *Toward a useful architecture for climate change negotiations*, Report no. 49, MIT Joint Program on the Science and Policy of Global Change (1999)).

Jung, T.Y., Ancha, S., Tamura, K., Sudo, T., Watanabe, R., Shimada, K., Kimura, H. (2005), *Asian Perspectives on Climate Regime Beyond 2012. Concerns, Interests and Priorities*, Institute for Global Environmental Strategies, Hayama.

Kelly, P. M. and Adger, W. N. (2000). Theory and practice in assessing vulnerability to climate change and facilitating adaptation. *Climatic Change* 47, 325-352

Kim, Y-G. and Baumert; K.A., (2002), Reducing Uncertainty Through Dual Intensity Targets, in Baumert, K.A. et al. (eds), 2002, *Building on the Kyoto Protocol: Options for Protecting the Climate*, World Resource Institute, Washington D.C

Kok, M.T.J., de Coninck H.C. (ed.) (2004), *Beyond Climate. Options for broadening climate policy*, RIVM REPORT 500019001/2004, Netherlands Research Programme on Climate Change.

Marburger, J.H. (2005), 'The U.S. Climate Change Vision', in *Global Issues*, June 2005, p. 15-16

Maes, F. (2004), *Internationaal Milieurecht*, Academic Course 2004-2005, Ghent University, Ghent, 436 p.

Maes, F. (2006), 'Nieuwe uitdagingen na de 11de bijeenkomst van de partijen bij het Klimaatverdrag en de eerste bijeenkomst van de partijen bij het Kyoto Protocol (Montreal, December 2005)', in *Wereldbeeld. Tijdschrift voor de Verenigde Naties*, Vereniging voor de Verenigde Naties, in druk.

McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J., White, K.S. (Eds.) (2001), *Climate Change 2001: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*, Cambridge University Press, Cambridge

Meinshausen, M. (2005), 'On the Risk of Overshooting 2°C', paper presented at the *Avoiding Dangerous Climate Change Conference*, MET Office, Exeter, UK, 1-3 February 2005

Mendelsohn, R. (1994), 'Property Rights and Tropical Deforestation', *Oxford Economic Papers, New Series*, Vol. 46, Special Issue on Environmental Economics, 750-756; Available at <http://links.jstor.org/sici?sici=0030-7653%28199410%292%3A46%3C750%3APRATD%3E2.0.CO%3B2-G>

Metz, B. (2000), International equity in climate change policy, in *Integrated Assessment*, Vol. 1 No. 2, (2000), 111-126.

Metz, B., Davidson, O., Swart, R., Pan, J. (Eds.) (2001), *Climate Change 2001: Mitigation. Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*, Cambridge University Press, Cambridge

- Metz, B., Berk, M., den Elzen, M., de Vries, B., van Vuuren, D. (2002), 'Towards an equitable global climate change regime: compatibility with Article 2 of the Climate Change Convention and the link with sustainable development', in *Climate Policy 2* (2002), p. 211-230
- Meyer, A., (2000), *Contraction and Convergence: The Global Solution to Climate Change*. Schumacher Briefing No. 5. Devon, UK: Green Books.
- Morita, T. et al., (2001), 'Greenhouse Gas Emission Mitigation Scenarios and Implications', in '*Climate Change 2001: Mitigation*', Third Assessment Report, Working Group III of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge
- Munasinghe, M., 'Sustainable Development and Climate Change: Applying the Sustainomics Transdisciplinary Meta-Framework.', *International Journal of Global Environmental Issues* 1(2001)13-55.
- Munasinghe, M., Swart, R. (2005), *Primer on Climate Change and Sustainable Development. Facts, Policy Analysis and Applications*, Cambridge University Press, Cambridge
- Müller, B. (2001), *Fair Compromise in a Morally Complex world: The Allocation of Greenhouse Gas Emission Permits Between Industrialised and Developing Countries*, EV30, Oxford Institute for Energy Studies
- Müller, B. (2006), *Montreal 2005. What Happened, And What It Means*, EV35, Oxford Institute for Energy Studies.
- Nakicenovic, N., Swart, R. (eds.) (2000), *Emission Scenarios. Special Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge
- Najam, A., Hus, S., Sokona, Y. (2003), 'Climate negotiations beyond Kyoto : developing countries concerns and interests', in *Climate Policy 3* (2003), 221-231.
- Najam, A., Rahman, A., Huq, S., Sokona, Y. (2003), 'Integrating sustainable development into the Fourth Assessment Report of the Intergovernmental panel on Climate Change', in *Climate Policy 3S1* (2003), S9-S17
- Ndayizeye, A., Winarso, P.A., Fitz Gerald J., Kononov, S. (2003), Report on the in-depth review of the third National Communication of Belgium, UNFCCC. Available at: <http://unfccc.int/resource/docs/idr/bel03.pdf>
- Nemry, F., Ellegaard, E. (2004), *Climate Change Action beyond 2012*, Belgian Federal Ministry for Environment, Brussels
- Nordhaus, W.D, (2002), *After Kyoto: Alternative Mechanisms to Control Global Warming*, Paper prepared for the meetings of the American Economic Association and the Association of Environmental and Resource Economists
- NEPAD (2003), *Action Plan of the Environment Initiative*, <http://www.nepad.org/2005/files/documents/113.pdf>
- Oberthür, S., Ott, H. (1999), *The Kyoto Protocol: International Climate Policy for the 21st century*, Springer, Berlin.
- O' Brien K, Eriksen S, Schjolden A, Nygaard L P. (2004), 'What's in a word? Conflicting interpretations of vulnerability in climate change research', *CICERO Working Paper* 2004:04. Oslo: CICERO (Centre for International Climate and Environmental Research – Oslo).
- OECD (1972), *OECD Recommendation on Guiding Principles concerning Environmental Policies*, May 26 1972, 11 ILM 1172 (1972).

- O'Neill, B. C., & Oppenheimer, M., 'Dangerous climate impacts and the Kyoto Protocol', *Science*, 296 (2002) 1971–1972.
- Oppenheimer, M., 'Defining dangerous anthropogenic interference; the role of science, the limits of science', *Risk Analysis* 25 (2005) 1399-1407
- Oppenheimer, M., Müller, F. (2003), *Climate Change: The Case for Long Term Targets*, prepared for *High-Level Transatlantic Dialogue on Climate Change*, German Institute for International and Security Affairs and the Brookings Institution, October 17.
- Ott, H.E., Sachs, W. (2000), *Ethical Aspects of Emission Trading*, Wuppertal Papers nr. 110, Wuppertal Institute
- Ott, H.E. (2001), 'Climate Change: an important foreign policy issue', in *International Affairs* 77, 2 (2001), p. 277-296.
- Ott, H.E., Brouns, B., Sterk, W., Wittneben, B. (2005), 'It Takes Two to Tango – Climate Policy at COP 10 in Buenos Aires and Beyond', in *Journal for European Environmental & Planning Law* 2/2005, p. 84-91.
- Ott, H.E., Winkler, H., Brouns, B. (2004), *Climate Protection Programme. South-North Dialogue on Equity in the Greenhouse. A Proposal for an Adequate and Equitable Global Climate Agreement*, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).
- Ott, K., Klepper, G., Lingner, S., Schäfer, A., Scheffran, J., Sprinz, D., Schröder, M. (2004), *Reasoning Goals Of Climate Protection. Specification of Article 2 UNFCCC*, Umweltbundesamt, Berlin
- Pan, J. (2005), 'China and climate change: the role of the energy sector', *Policy Briefs*, SciDevNet, <http://www.scidev.net/dossiers/index.cfm?fuseaction=specifictopics&dossier=4&topic=152>
- Papineau, M. (2005), 'China Beyond 2012', in *Cicerone*, 1-2005, Center for International Climate and Environmental Research, Oslo, www.cicero.uio.no
- Paredis, E., Lambrecht, J., Goeminne, G., Vanhove, W. (2004), *VLIR-BVO project 2003: Elaboration of the Concept of Ecological Debt. Final Report*, September 2004, CDO, Gent
- Parry, M., Arnell, N., McMichael, T., Nicholls, R., Martens, P., Kovats, S., Livermore, M., Rosenzweig, C., Iglesias, A., Fischer, G., (2001), 'Millions at risk: defining critical climate change threats and targets'. *Global Environmental Change* 11, 181–183.
- Patwardhan, A., Schneider, S. H., & Semenov, S. M. (2003). *Assessing the Science to Address UNFCCC Article 2: A Concept Paper Relating to Cross Cutting Theme Number Four*. Geneva: Intergovernmental Panel on Climate Change
- Paavola, J., Adger, W.N., 'Justice and adaptation to climate change', Tyndall Centre for Climate Change Research, *Working Paper 23*.
- Parry, J.E., Hammill, A., and Drexhage, J. (2005), *Climate Change and Adaptation*, IISD
- Pearson, B. (2004), 'Market Failure. Why the Clean Development Mechanism won't promote clean development', in *CDMWatch*, November 2004, www.cdmwatch.org
- Philibert, C., How could emissions trading benefit developing countries, *Energy Policy* 28 (2000) 947-956
- Philibert, C., J. Pershing, J. Corfee Morlot and S. Willems, (2003), *Evolution of mitigation commitments: some key issues*, OECD and IEA information paper, Paris
- Raskin, P. et al., (1998), *Bending the Curve: Toward Global Sustainability. A Report of the Global Scenario Group*. Boston: Stockholm Environment Institute.

Ringius, L., et al. (1998). 'Can multi-criteria rules fairly distribute climate burdens? OECD results from three burden sharing rules', *Energy Policy* 26 (10) (1998), 777–793.

Ringius, L. et al. (2002), 'Burden Sharing and Fairness Principles in International Climate Policy', *International Environmental Agreements: Politics, Law and Economics*, Volume 2, Issue 1, (2002), 1-22.

Rosa, Muylaert and Pires de Campos, (2003), 'the Brazilian proposal and its scientific and methodological aspects' in *Issues and Options: The Kyoto Protocol's Second Commitment Period*, IISD.

Rosenbaum, L. et al. (2004), Climate change and the forest sector. Possible national and subnational legislation, *FAO Forestry Paper 144*, Food and Agriculture Organization of the United Nations, Rome, 73 p. Available at:

http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/007/Y5647e/y5647e06.htm

RSA (Republic of South Africa) (2006), *Policy Discussion Paper for the Ministerial Indaba on Climate Action*, South Africa, 18 to 21 June 2006

Samaniego, J, and Figueres, C.,(2002), 'Evolving to a Sector-based Clean Development Mechanism', in Baumert, K.A. et al. (eds), 2002, *Building on the Kyoto Protocol: Options for Protecting the Climate*, World Resource Institute, Washington D.C.

Sands, P. (2003), *Principles of International Environmental Law*, Cambridge University Press, Cambridge, 1116 p.

Shelton, D. (2002), 'Righting Wrongs: Reparations In The Articles On State Responsibility', *American Journal of International Law*, Vol. 96, No. 4, (2002), p. 833-856. Available at: <http://www.asil.org/ajil/ilcsymp5.pdf>

Shukla, P.R. (2002), *Development and Climate: a view from the South*, Atelier Climat et développement, IDDRI/CIREN

Sijm, Jansen and Torvanger, A, Differentiation of mitigation commitments: the multi-sector convergence approach, *Climate Policy* 1(2001) 481-497.

Simms, A., Magrath, J., Reid, H. (2004), *Up in smoke? Threats from, and responses to, the impact of global warming on human development*, New Economics Foundation, London

Simms, A., Reid, H. (2005), *Africa – Up in smoke? The second report from the Working Group on Climate Change and Development*, New Economics Foundation, London

Smit, B. and Pilifosova, O. (2001) Adaptation to climate change in the context of sustainable development and equity. In *Climate Change 2001: Impacts, Adaptation, and Vulnerability* McCarthy et al. (eds), Cambridge University Press, Cambridge.

Sokona Y. and Denton F., 'Climate change impacts: can Africa cope with the challenges?' *Climate Policy* 1 (2001) 117–123

Srivastava, L., Heller, T. (2003), *Integrating Sustainable Development and Climate Change in AR 4*, Guidance note on cross-cutting issues, IPCC

Stewart, Richard B. and Jonathan B. Wiener (2003). *Reconstructing Climate Policy: Beyond Kyoto*, Washington: AEI Press, April 2003.

Strauss, A.J. (2003), 'The Legal Option: Suing the United States in International Forums for Global Warming Emissions', 33 *ELR*, (2003), 10185-10191. Available at: <http://www.climatelaw.org/media/strauss.pdf>.

Swart, R., Robinson J., Cohen, S. (2003), 'Climate change and sustainable development: expanding the options', in *Climate Policy* 3S1 (2003), S19-S40.

Swedish Environmental Protection Agency, *Climate cooperation beyond 2012. Report on a Government Assignment on future international climate cooperation*, Report 5428, November 2004, 188 p.

Tol, R.S.J., Fankhauser, S., Richels, R.G., Smith, J.B., (2000). 'How much damage will climate change do? Recent estimates'. *World Economics* 1 (4), 179–206.

Tol, R.S.J. and Verheyen, R. (2004), 'State responsibility and compensation for climate change damages – a legal and economic assessment', *Energy Policy* 32, (2004), 1109-1130. Available at: <http://www.uni-hamburg.de/Wiss/FB/15/Sustainability/enpolliability.pdf>;

Toth, F. and Mwandosya, M. (2001), 'Decision-Making Frameworks' in B. Metz et al. '*Climate Change 2001: Mitigation. Contribution of Working Group III to the Third Assessment Report of the Intergovernmental Panel on Climate Change*',. Cambridge: Cambridge University Press.

Torvanger, A., Twena, M. and Vevatne, J. (2004), 'Climate Policy beyond 2012', Centre for International Climate and Environmental Research; CICERO Report 2004:02.

UNFCCC (1992), *United Nations Framework Convention on Climate Change*, United Nations.

UNFCCC (1997), *The Kyoto Protocol to the Convention on Climate Change*, United Nations.

UNFCCC (2005), *SOGE2005. Proceedings of the Seminar of Governmental Experts, Bonn, Germany, 16/17 May 2005*

UNFCCC (s.d., a), "Climate Change Information Sheet 17", http://unfccc.int/essential_background/background_publications_htmlpdf/climate_change_information_kit/items/300.php

UNFCCC (s.d., b), "Climate Change Fact Sheet 221", <http://unfccc.int/resource/ccsites/senegal/fact/fs221.htm>

United Nations (UN), 2000, '*Millennium Declaration: resolution Adopted by the General Assembly.*', New York.

Vanclay, J. K. and Nichols, J. D. (2005), 'What Would a Global Forest Convention Mean for Tropical Forests and for Timber Consumers?', *Journal of Forestry*, Volume 103, Number 3, April/May 2005,120-125.

Verheyen, R. (2005), *Climate Change Damage and International Law*, Martinus Nijhoff Publishers, Leiden, 406 p.

Wairoto, J. (2006), 'Science and the Policy of Climate: an African Perspective', lecture for the climate change workshop *Post 2012: What Does the South Think?* , 2 and 3 March 2006, Ghent University, Belgium

Watson R T, Zinyowera M C, and Moss R H (eds). 1996. *Climate change 1995. Impacts, adaptation, and mitigation of climate change: scientific-technical analyses*, Contribution of Working Group II to the Second Assessment of the Intergovernmental Panel on Climate Change, Cambridge: Cambridge University Press. 878 pp.

Weiss, E.B. (2002), 'Invoking State Responsibility in the Twenty-First Century', *American Journal of International Law*, Vol. 96, No. 4, (2002), p. 798-816. Available at: <http://www.asil.org/ajil/ilcsymp3.pdf>

Winkler, H., Spalding-Felcher, R., Mwakasonda, S., Davidson, O. (2002), 'Policies and Measures for Sustainable Development', in Baumert et al. (ed.) *Building on the Kyoto Protocol: Options for Protecting the Climate*, World Resources Institute, Washington D.C.

Wittneben, B., Sterk, W., Ott, H.E., Brouns, B. (2006), 'The Montreal Climate Summit: Starting the Kyoto Business and Preparing for post-2012. The Kyoto Protocol's First Meeting of the Parties (MOP 1) and COP 11 of the UNFCCC', in *Journal for European Environmental & Planning Law* 2, (2006), p. 90-100.

World Commission on Environment and Development (1987), *Our Common Future*, Oxford University Press, Oxford/New York

WWF (s.d.), *The Gold Standard. Premium quality carbon credits*, www.cdmgoldstandard.org

X. (2004a), DGDC Annual report 2003, Directorate-General for Development Cooperation. Available at: http://www.dgdc.be/documents/en/annual_report/2003/dgdc_annual_report_2003.pdf

X. (2004b), "*ODA Eligibility Issues for Expenditures under the Clean Development Mechanism*". A Proposal by the Chair of the Development Assistance Committee, DAC/CHAIR(2004)4, DAC High Level Meeting, 15-16 April 2004. Available at: <http://www.oecd.org/dataoecd/56/53/36083110.pdf>

X. (2004c), Statement Adopted By Members Of The Oecd's Development Assistance Committee (DAC), 15-16 April 2004. Available at: <http://www.oecd.org/dataoecd/42/26/31505731.pdf>

X. (2005a), DGDC Annual report 2004, Directorate-General for Development Cooperation. Available at: http://www.dgdc.be/en/dgdc/annual_report/index.html

X. (2005b), *Exporting pollution: the double standards of the Belgian climate policy*, Greenpeace Belgium. Available at: <http://www.greenpeace.org/raw/content/belgium/nl/press/reports/exporting-pollution-the-doubl.pdf>

X. (2006), *Belgium's Fourth National Communication On Climate Change under the UNFCCC*, January 2006. Available at: <http://unfccc.int/resource/docs/natc/belnc4.pdf>

Yamin, F. (1999), Equity, Entitlements and Property Rights under the Kyoto Protocol: the Shape of 'Things' to Come, in *Reciel Vol. 8 Issue 3*, (1999), 265-274.