Climate Change Overview

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The purpose of this chapter is to place the evaluation of the GEF portfolio of climate change projects in the context of the broader effort of addressing climate change. The strategic challenges posed by the external environment are identified, in order to assess the implications for GEF's role. Orienting itself against the major challenges assists in shaping the most effective future strategy for the GEF climate change programme.

This chapter begins with a brief review of the state of knowledge of climate change science and impacts as assessed by the Intergovernmental Panel on Climate Change (IPCC). Next it reports on the status of the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol and assessments of existing commitments against the required effort. Turning to the negotiations, the main issues still to be addressed are identified, focusing in particular on funding and drawing broad lessons related to GEF's role in the context of other institutions and programmes. The final part feeds into an analysis of internal trends.

1. REVIEW OF CLIMATE CHANGE SCIENCE AND IMPACTS

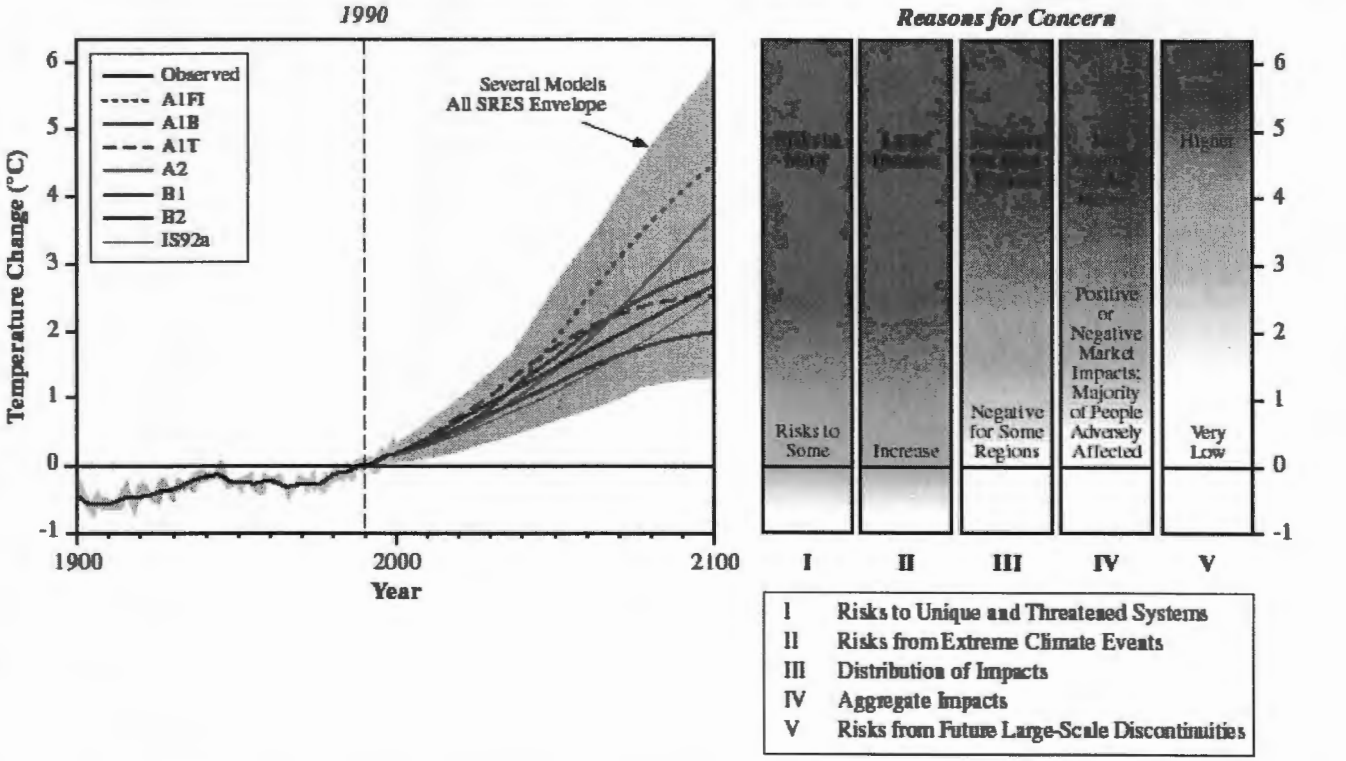
Human activities are releasing greenhouse gases (GHGs) into the atmosphere. The major GHGs are carbon dioxide (CO_2 from energy production and use and from deforestation, methane (CH_4) and nitrous oxide (N_2O) from agriculture and land use change, and three 'trace gases' or artificial chemicals including two halocarbons (HFCs, PFCs) and sulphur hexafluoride (SF_6). The concentration of these gases has already increased from about 275 ppmv (parts per million by volume) prior to the industrial revolution (year 1000 to 1750) to 368 ppmv in 2000 (IPCC 2001d), an increase of 34%. Carbon that has been stored in the Earth's crust (in the form of oil, coal, and other fossil fuels) over millions of years is being released into the atmosphere relatively rapidly. The mean average surface temperatures over the twentieth century increased by about 0.6°C (± 0.2°C) [i].

Rising levels of GHGs in the future are expected to cause climate change. If growth in emissions continues, global temperatures are expected to rise between 1.4 and 5.8°C by the end of the 21st century (IPCC 2001a). This is two to ten times more than observed global warming in the 20th century, and land areas are expected to warm more than oceans. Different scenarios for emissions – without climate policy – are shaped by major drivers, in particular economic growth, demographic changes and technological innovation, as described in an IPCC Special Report on Emission Scenarios (SRES) (IPCC 2000a). These changes are occurring at a very rapid rate in geological time, very likely without precedent in the last 10,000 years. The left-hand side of Figure 1 shows observed changes (solid black line) and a wide envelope of projections, which reflect the different assumptions of various 'families' of scenarios (A1F1 etc).

Climate change is likely to have a significant impact on the global environment. In general, the faster the climate changes, the greater will be the risk of damage. The mean sea level is expected to rise 15-95 cm[ii] by the year 2100, causing flooding of low-lying areas and other damage. Figure 1 shows the relationship between increasing temperatures (differing with various emission scenarios) and reasons to be concerned about climate change impacts. The list of impacts is long, but a few examples will convey the scale of the problem: the viability of key ecosystems is put at risk by a temperature change of only 1-2°C, including coral reefs, arctic ecosystems, and coastal wetlands; the Greenland ice sheet, which contains sufficient water to raise sea levels by ~seven meters, would become unstable with a local warming of 3°C, and gradually lose its ice mass (IPCC 2001b).

Regional impacts have been studied by the IPCC, which finds that poor countries and communities are most vulnerable to the impacts of climate change, because of their higher sensitivity to climate disruptions and lower capacity to adapt, and more limited resources with which to mitigate the impacts (IPCC 2000b). Human society will face new risks and pressures on food security, water resources, physical infrastructure and from extreme events – floods, droughts and storms. Adaptation is needed for both human and ecosystems to future climatic regimes.

Figure 1: Projected temperature changes and reasons for concern (IPCC 2001a)



The ultimate objective of the Convention is to stabilise GHG concentrations at levels preventing dangerous climate change, while allowing ecosystems to adapt, ensuring food security and allowing sustainable economic development (UNFCCC 1992: Article 2). This will require significant effort. Given an expanding world economy and growing populations, it would demand dramatic improvements in energy efficiency, a switch to cleaner sources of energy and fundamental changes in other economic sectors. The IPCC's Second Assessment Report quantified that "immediate stabilisation of the concentration of carbon dioxide at its present level could only be achieved through an immediate reduction in its emissions of 50-70% and further reductions thereafter" (IPCC 1995).[iii]

By comparison, the Kyoto Protocol targets amount to 5.2% reductions from 1990 levels, and only for industrialized countries. What matters for future climate change are cumulative emissions in the future – reductions that will be required this century are in the order of magnitude of 1 100 - 1500 Gigatonnes of CO_2-equivalent ($GtCO_2$-eq), while mitigation potential ranges from 13.2 to 18.3 $GtCO_2$-eq per year (IPCC 2001c). Clearly there is a large gap between what is required to address the problem and the current commitments that have been negotiated in the international arena. The estimated size of the emissions "gap" of Annex I Parties (excluding the US and Australia) is expected to be approximately 275-880 Mt CO_2-eq by 2010 (Grubb 2003). As of April 2004, the mitigation effort of 77 projects under the Clean Development Mechanism (CDM) was 130 Mt CO_2-eq up to 2012 (www.cdmwatch.org/quick-stat/), although this does not count projects that will still be developed. More projects can be expected, but the level of effort needs to increase by an order of magnitude.

The goal of the UNFCCC is stabilizing GHG concentrations, under certain constraints. The Convention recognises that in achieving this task equity is crucial, and it establishes the principle of 'common but differentiated responsibilities and respective capabilities' (Article 3.1). The uneven responsibility of different regions of the world is shown graphically in Figure 2, which redraws the map of the world with areas proportional to historic cumulative CO_2 emissions (1900-1990) from fuel combustion.

Regional analysis as shown in the map hides significant differences between countries (and indeed within countries). Since countries are the Parties to the Convention and the Protocol, some indicators of *national*

level efforts made to control GHG emissions is appropriate. The Global Governance Initiative report to the World Economic Forum provided a provide some useful albeit imperfect indicators for some major countries (see Table 1), both industrialized and developing (GGI 2004). The notion of responsibility is captured in relation to several indicators, while national income gives some sense of capability to mitigate. It also records the share of renewables and status in ratifying Kyoto and submitting national communications. The current and historical situation presented in these figures provides the historical context for considering future targets and scenarios (below). First, we turn to a brief review of the status of the climate change negotiations.

Figure 2: Contributions to global warming (WRI 2001)

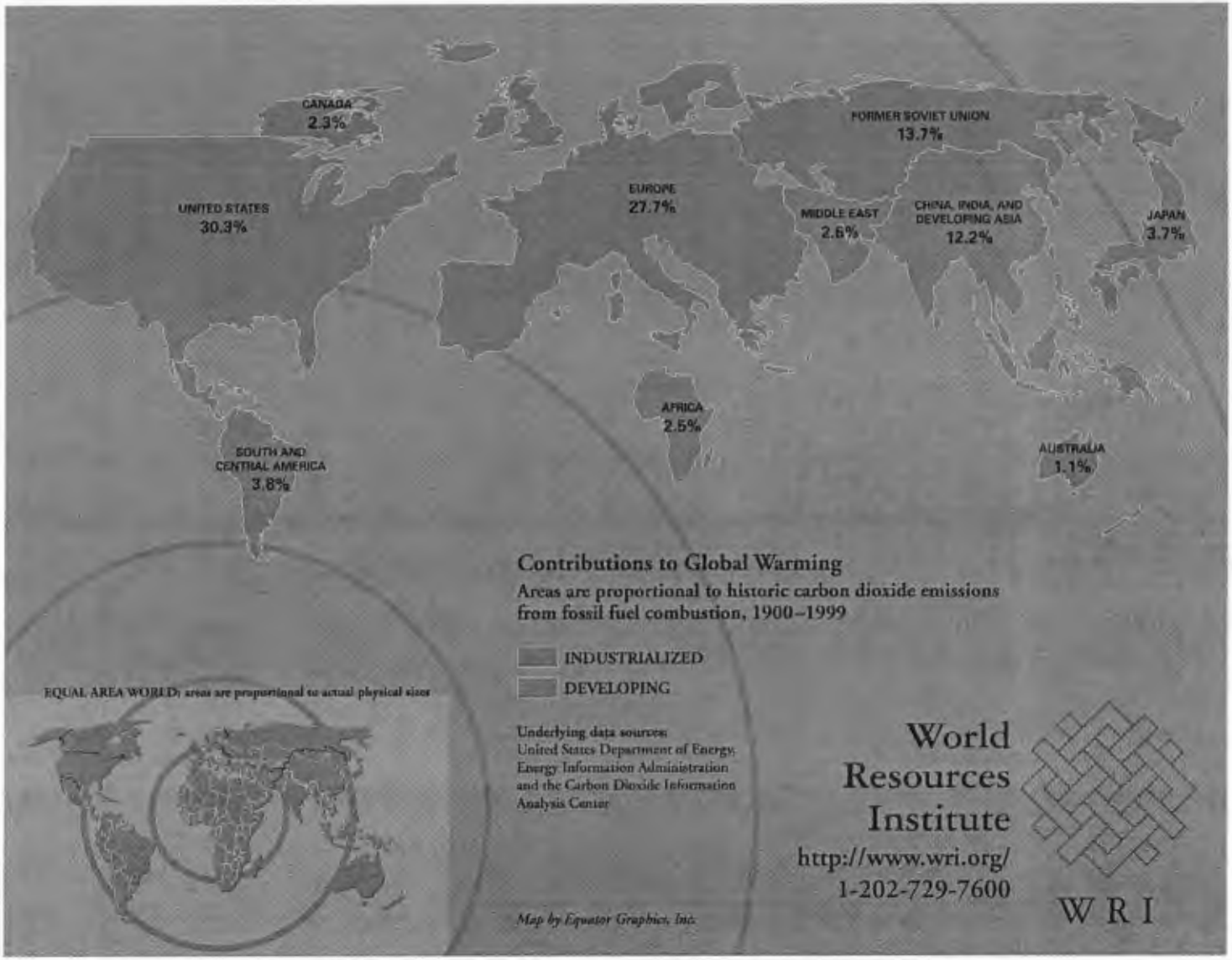


Table 1: Indicators (Adapted from GGI 2004); (Data from WRI 2003)

	Responsibility / Emissions					Capability	Renewables	Status in negotiations	
Country	Contribution to the global CO_2 concentration increase (1950-2000)	Change in CO_2 emissions (1990 - 2000)	Emissions per capita (tons of C equiv, 2000, all gases)	Carbon Intensity (tons of C per $GDP-PPP, 2000)	Change in carbon intensity (1990-2000)	GDP per capita ($PPP, 2000)	Share of renewables in electricity mix (2000)	Kyoto Protocol ratification	Submission of national comm-unication
Australia	1 %	26 %	6.6	193	-11.4 %	25,693	9 %	No	Yes
Canada	2 %	22 %	6.0	172	-7.8 %	27,840	61 %	Yes	Yes
EU	17 %	0 %	2.9	99	-18.1 %	23,645	15 %	Yes	Yes
Japan	5 %	12 %	2.8	104	-2.4 %	26,755	10 %	Yes	Yes
Russia	9 %	-32 %	3.8	427	2.6 %	8,406	19 %	No	Yes
US	26 %	18 %	6.6	162	-14.5 %	34,142	9 %	No	Yes
China	10 %	39 %	1.1	201	-46.8 %	3,976	17 %	Yes	No
Brazil	1 %	53 %	1.8	73	17.6 %	7,604	90 %	Yes	No
India	3 %	64 %	0.5	99	-3.6 %	2,358	14 %	Yes	No
S. Korea	1 %	85 %	3.0	185	2.1 %	17,470	2 %	Yes	Yes
Mexico	1 %	25 %	1.5	125	-11.3 %	8,985	19 %	Yes	Yes
S. Africa	1 %	17 %	2.6	200	-1.7 %	9,466	1 %	Yes	No
World	**100%**	**14 %**	**1.6**	**147**	**-13.1 %**	**7,295**	**18.7 %**		

2. STATUS OF CLIMATE AGREEMENTS AND NEGOTIATIONS

The response of the international community to the problem of climate change is organized under the UNFCCC, adopted at the 1992 Rio Earth Summit and now including 186 Parties. As the name indicates, the FCCC is a framework, an institutional framework for the multilateral response to climate change.

The highest decision-making body of the Convention is the Conference of the Parties (COP). All states that have ratified or acceded to the Convention are Parties to the FCCC. The COP meets annually, with its two subsidiary bodies meeting between sessions - the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI). The COP and subsidiary bodies are serviced by a secretariat. The COP can review existing commitments, as well as adopting new commitments – such as those agreed under the Kyoto Protocol in 1997. While the Convention includes commitments, these are not binding.

Under the Convention, both developing and developed countries accept commitments to submit 'national communications' including GHG inventories. They agree to adopt national programmes for mitigation and adaptation. Technology transfer is another broad commitment. All Parties agree to take climate change into account in policy and planning, to cooperate on scientific matters, and to promote education and information. It is recognised that implementation of commitments by developing countries will depend on financial and technical assistance from the developed countries (UNFCCC 2001).

Annex I parties have more specific commitments under Article 4.2 of the Convention. For instance, there is a commitment for developed countries (Annex I Parties to the Convention) to take measures aimed at returning their emissions to 1990 levels by the year 2000 in FCCC Article 4.2.b, but this was not achieved by many countries.[iv] The richest countries (Annex II, essentially the OECD), agree to provide 'new and additional financial resources' and facilitate technology transfer. Annex II countries pay the 'agreed full cost' of non-Annex I national communications under Article 4.3. They also help fund transfer of environmentally sound technologies, particularly for developing country Parties.

Specific mitigation commitments for industrialized countries were negotiated and included in the Kyoto Protocol. The Parties to the Convention have agreed by consensus that developed countries will have a legally binding commitment to reduce their collective emissions of six GHGs by at least 5% compared to 1990 levels during the period 2008-2012. The Protocol establishes three 'flexible mechanisms': an emissions trading regime which allows assigned amounts to be traded under Article 17; Joint Implementation – a project-based mechanism involving Annex I parties under Article 6; and the Clean Development Mechanism (CDM), which allows investment by Annex I parties in projects in developing countries under Article 12. These mechanisms assist Annex I parties in achieving their emission reductions at least cost. The CDM includes a second objective of assisting developing countries in achieving sustainable development.

The Convention and Protocol already include many commitments on adaptation. All Parties to the Convention have agreed that 'the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change (...) should be given full consideration' (Article 3.2). While all Parties are to cooperate in general adaptation activities, the commitment to 'agreed full costs' includes development of national vulnerability and adaptation assessments and incremental costs for adaptation technologies.

Although the focus of the Kyoto Protocol is on establishing targets for GHG reductions and mechanisms for achieving it, it is also structured to assist in generating funding to address adaptation needs. Parties to the Protocol have agreed, in its Article 12.8, 'to ensure that a share of the proceeds from certified [CDM] project activities is used to (...) assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation'. With the setting up of the Adaptation Fund (see below), a share of proceeds (2%) from CDM project revenue will contribute to adaptation funding.

The Kyoto Protocol has not yet entered into force. To do so, it must be signed and ratified by 55 countries, with total emissions accounting for 55% of the CO_2 emissions from Annex I countries in the year 1990.[v] The emissions (CO_2 only) for the base year (mostly 1990) are listed in Annex B of the Protocol. As of April 2004, 119 countries had ratified the agreement, but only 44.39% of Annex I emissions were included.

Ratifying Parties include many major developing countries as well as the European Union (and its members), Japan, Canada and a few other industrialized countries. Notably absent are the United States, Australia and Russia (but all remain Parties to the Convention). The US made clear in March 2001 that it did not intend ratifying the Protocol, and Australia is also unlikely to change its position. The US alone accounts for 36.1% of emissions in Annex B (and ca. 24% of global CO_2 emissions, 16% of all GHGs in 2000). In part, the withdrawal of the US consolidated the political will of the rest of the world to go ahead and complete the Marrakech Accords (at COP-7 in 2001 was held in Marrakech).

The current US climate strategy aims to 'reduce' emissions intensity (GHG / GDP) by 18% until 2012. This target is almost identical with the 17% actual reduction in the 1990s. The proposed *relative* target would permit an increase in *absolute* emissions for the largest emitter due to economic growth, estimated at an overall increase in emissions of about 30% by 2012 compared to 1990 (RIVM 2002). Internationally, the US actively pursues bilateral negotiations, including with major developing countries (www.state.gov/g/oes/climate/).

Russian ratification would add another 17.4% of required emissions and thus is needed for the Kyoto Protocol to enter into force. While Russian representatives at the World Summit on Sustainable Development in 2002 and on several other occasions indicated that Russia would ratify, formal ratification has not been taken through the Duma. Participation in the flexible mechanisms should be financially attractive, with Russia being expected to sell significant amounts of 'hot air' - as Russia is likely to stay well below its Kyoto target, the excess emission allowances could be sold on the international market, to other industrialized countries that have not achieved the necessary reductions. Without the US as a major buyer, Japan would be expected to buy much of these credits. Russia would also be able to attract project investment under Joint Implementation (Article 6 of the Protocol). Another major development is the European Union's Emission Trading Scheme (ETS), which is critical to its plan for achieving its Kyoto targets (see below for details).

3. TARGETS, COMMITMENTS AND FUTURE SCENARIOS

Along with an emissions trading regime and the CDM, The Kyoto Protocol set quantified and binding emission reduction and limitation targets for Annex B countries starting with a first commitment period 2008-2012. Industrialized countries have contributed most to GHG emissions over time. This is recognized in the Convention's first stated principle, requiring developed countries to take the lead.

> 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 common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof. (UNFCCC 1992: Article 3.1)

Hence, the Kyoto Protocol quantified emissions reduction targets only for Annex I (under the Convention, or Annex B, under the Protocol) Parties. Clearly, annual emissions from developing countries (non-Annex I, hereafter 'NAI') are increasing. According to data from the World Resources Institute, CO_2 emissions from fuel combustion in developing countries have increased 38.9% over the 1990-2000 period, resulting in a share of 40% of annual global emissions in 2000 (WRI 2003). However, CO_2 emissions *per capita* were 11.9 tCO_2 / cap for Annex I and 2.0 tCO_2 / cap for NAI countries in 2000.

Considering future emissions and 'cross-over' dates (when NAI emissions would exceed Annex I as a group) are highly sensitive to the assumed emission scenario (IPCC 2000a) and on the basis and units of comparison (see box). Cross-over will occur soon if one looks at annual CO_2 emissions; if the analysis is based on temperature increase, cross-over is much later. Annex I countries emit primarily CO_2, while developing economies with large agricultural and forestry sectors can be expected to have a higher share of methane and nitrous oxide in their total – hence it matters which gases are included.

Box: When do Annex I and non-Annex I emissions 'cross over'
(Den Elzen & Schaeffer 2002)

'The moment of convergence between the Annex I and non-Annex I regions shifts from 2065 for only fossil-fuel CO2 emissions to 2055 for all anthropogenic CO2 emissions and, finally, to 2030 for all anthropogenic greenhouse gas emissions.' (page 57)

'By using a modeling framework, we have shown that for a central reference case the moment of convergence of contribution of Annex I and non-Annex I is delayed from 2015, for anthropogenic CO2 emissions, to 2045, for CO2 concentration, and, finally, to 2055 for temperature increase.' (page 63)

'Including land-use related CO2 emissions and non-CO2 emissions in calculating regional contributions to temperature change sharply increases the share of non-Annex I in temperature increase. However, the range of outcomes covered by the cases "only fossil fuel CO2 emissions" and "all greenhouse gas emissions" decreases in future, because of the increasing dominating effect of the fossil fuel CO2 emissions in the overall CO2-equivalent emissions.' (page 65)

Whatever analytical approach is taken, it is clear that the contribution of developing countries *as a* group will constitute a growing share in future. It is equally evident that Annex I responsibility will remain higher for a long time to come, if the analysis is per capita – critical if the analysis is to be fair (Agarwal & Narain 1991), or considers cumulative emissions, which are the ones that matter most to the climate (IPCC 2001c).

The gap between current targets and the projected emissions means that greater mitigation effort is needed. The IPCC's second assessment summarised the implications of continued emissions and required effort as follows. "If net global anthropogenic emissions (i.e. anthropogenic sources minus anthropogenic sinks) were maintained at current levels (about 7 GtC/yr including emissions from fossil fuel combustion, cement production and land-use change), they would lead to a nearly constant rate of increase in atmospheric concentrations for at least two centuries, reaching about 500 ppmv (approaching twice the pre-industrial concentration of 280 ppmv) by the end of the 21st century. Carbon cycle models show that immediate stabilisation of the concentration of carbon dioxide at its present level could only be achieved through an immediate reduction in its emissions of 50-70% and further reductions thereafter" (IPCC 1995).

Continuing the established FCCC principle that developed countries take the lead, deeper cuts in emissions in all Annex I countries will be required in future (IEA 2002; Aldy et al. 2003). Annex II commitments under the Convention and Protocol to assist developing countries financially will also continue. Indeed, as the need for quantified mitigation targets in the more rapidly industrialising developing countries grows, the requirements for funding will increase, with implications for GEF as the financial mechanism.

Further differentiation between developing countries will likely be needed (Agarwal & Narain 1991; Baumert et al. 2002; WBGU 2003; Sugiyama & Deshun 2004). NAI countries will expect Annex I countries to take the lead, but not all NAI countries can be expected to follow in the same way. Rapidly industrializing developing countries[vi] have *some* capability of limiting or even reducing their emissions, if their income and development levels are an approximate guide. The most advanced of these, already 'newly industrialized countries'[vii] have the same average Human Development Index as economies in transition, and GDP per capita of $10 701 compared to $7 163 for the latter (Ott et al. 2004). The GEF supports mitigation projects in a few NIC countries.

For least developed countries (LDCs), by contrast, indicators of responsibility are very low, with their total emissions of energy CO_2 accounting for less than 0.5% of the global total in 2000 (WRI 2003). Their focus is primarily on adaptation to the impacts of climate change. The GEF has operational mitigation projects in at least six of the 49 LDCs.

4. MITIGATION AND ADAPTATION: THE EVOLVING AGENDA FOR DEVELOPING COUNTRIES

Many detailed issues are currently being negotiated in the UNFCCC meetings, including sinks – removals of GHG from the atmosphere - in the CDM, national communications and a variety of technical matters. The main issues for the future are likely to remain mitigation and adaptation.

4.1 Mitigation

The discussions on mitigation within the UNFCCC negotiations have **evolved over time**. Much of the early discussions were influenced by concerns about 'energy for sustainable development' (for example Reddy & Goldemberg 1990). In terms of demonstrating technologies, the focus was often on focused on renewable energy and energy efficiency (Goldemberg & Johannson 1995). The operational programmes (OP's 5 and 6) of the GEF reflect this focus. In the negotiations, however, the exclusion of specific technologies was resisted. 'Negative lists' of technologies to be excluded – e.g. cleaner coal or nuclear energy technologies – were not endorsed in COP decisions, nor were 'positive lists' of renewables and efficiency. It was not seen as government's role, individually or in multi-lateral negotiations, to pick technology winners, and the literature supported investigation of different technologies and policies (IPCC 1996; Johannson et al. 1996). The IPCC reviews key developments in the knowledge around technological options to mitigate GHG emissions (IPCC 2001c: 26). Attention has moved from an exclusive focus on emission sources, to include greater consideration of removal of GHGs from the atmosphere by biological and other sinks (see below).

Recent discussions of mitigation efforts in developing countries have often been focused on the **CDM** (see below). While clearly an important mechanism, sustainable development is at least as important an approach to mitigation. The debates on climate change **mitigation and sustainable development** have been linked, in particular with the realisation that significant mitigation effort was already taken place in developing countries (see 'experiences with mitigation programmes' below). More would be needed in future by 'promoting development while limiting greenhouse gas emissions' (Goldemberg & Reid 1999).

Choosing a more sustainable development path means that the baseline - or reference – GHG emissions are lower than in other possible futures. The IPCC's Third Assessment Report found that this choice of future 'world' more important than the drivers determining GHG emissions (IPCC 2001c: 142). Beginning with one or more future development ambitions it would be possible to describe paths towards those goals (Banuri & Weyant 2001; Winkler et al. 2002a). The SRES reference scenarios shown in Figure 3 do not include any climate policy and are shown together with mitigation scenarios resulting in atmospheric concentrations of CO_2 ranging from 450 to 750 ppmv. The selected scenarios show clearly that the gap between the shaded reference path and the various (solid) stabilisation paths is smaller in some cases. In other words, to reach the same atmospheric concentrations, significantly less effort is required for development paths where reference emissions are low (in the B family) than if the future world had higher emissions (in the A scenarios). The implication is that there are significant synergies between climate and non-climate policies (IPCC 2001c).

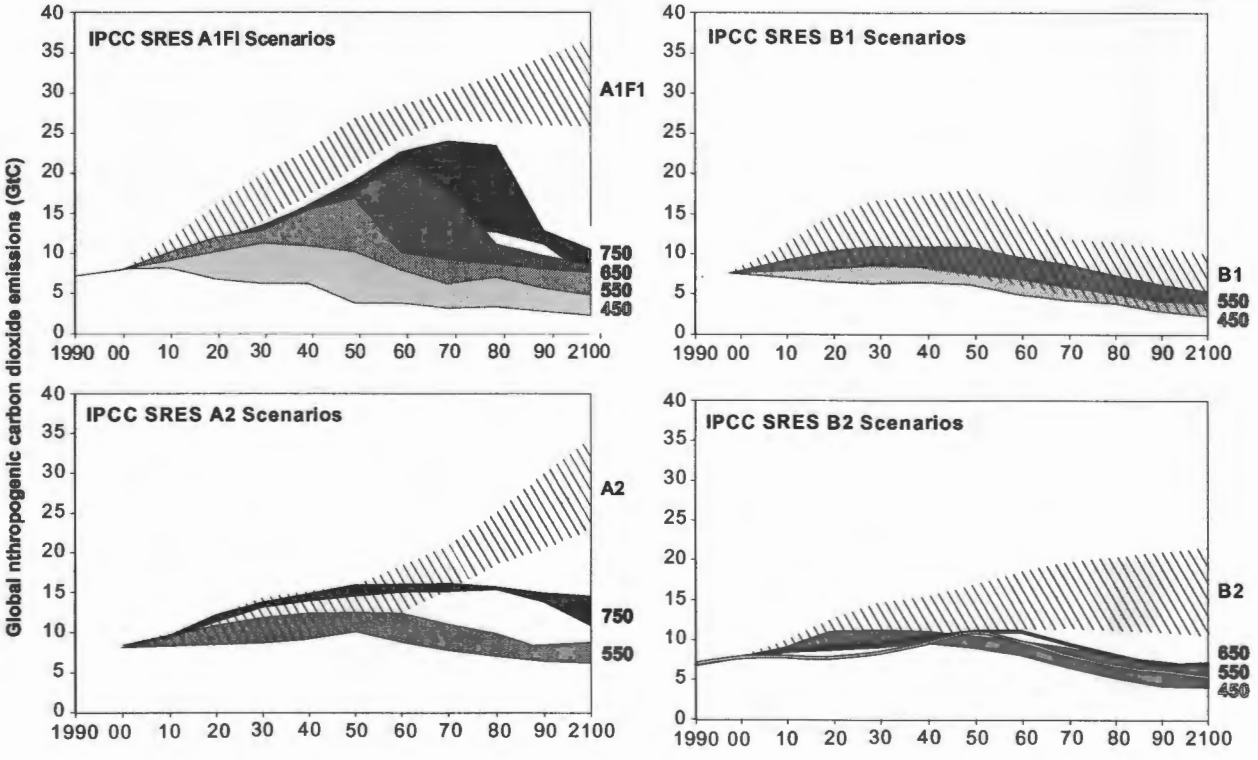


Figure 3: Comparison of SRES reference emissions scenarios (without climate policy) and 'post-SRES' climate change mitigation scenarios (IPCC 2001c: p. 151, fig. 2.14)

However, shifting development paths requires transitions in larger systems, not least energy economies. This broader approach to mitigation links back to 'energy for sustainable development' and informs the debate about future mitigation commitments of developing countries. The prospects for a future round on **quantified mitigation commitments** are not on the official agenda, but increasingly are discussed by research organizations (Gupta & Bhandari 1999; Yamin 1999; Rosa Pinguelli & Kahn Ribeiro 2001; Byrne & Glover 2002; IEA 2002; Winkler et al. 2002b; Baumert & Figueres 2003; CAN 2003; Global Environmental Subcommittee 2003; Höhne et al. 2003; Willems & Baumert 2003; Ott et al. 2004; Sugiyama & Deshun 2004). However, with a review of 'demonstrable progress' due in 2005 (under Protocol Article 3.2), these discussions may become formal in the next few years.

Mitigation has tended to focus on reducing emissions from sources. The other side of the carbon cycle, removal of GHGs from the atmosphere by sinks, [viii] has recently gained more attention. Allowances for existing **sinks** in Annex I countries were critical in finalising the Marrakech Accords, with significant concessions to Russia, Japan and others under Article 3.3. and 3.4 of the Protocol (FCCC/CP/2001/13/Add.1).

Secondly, rules for sinks projects under the CDM were agreed at COP-9 in 2003, which agreed modalities and procedures for land use, land use change and forestry (LULUCF) projects. These rules now need to be given operational effect, a process that is complicated by the greater complexity of the underlying issues, e.g. permanence, biodiversity etc. Mitigation projects in the LULUCF sector are therefore expected to developed within the next GEF budget period.

The focus in both of these two areas is on biological sequestration or sinks. Carbon capture and storage (CCS) by non-biological means is receiving scientific attention. The IPCC is compiling a special report on CCS, considering options such as storage in geological formations, re-injecting CO_2 oil and gas fields and even storage in the deep ocean.

How has the GEF's role evolved over time in line with COP expectations?

- started with technology demonstration,
- then removal of barriers to technology penetration,
- then market aggregation and removal of economic barriers?
- Adding in transport and now adaptation

The evolution of approaches to mitigation keeps revisiting the link to sustainable development. GEF's role within mitigation has been focused in specific areas (see below). The broader challenges of mitigation in developing countries keeps raising the question whether the focus of efforts should be on climate change or sustainable development (see Yamin & Depledge 2003b). Greater capacity for adaptation is also enhanced by sustainable development.

4.2 Adaptation: funding, mainstreaming, implementation

The issue of adaptation has recently received more attention in the negotiations, since the details of implementing major aspects of the Kyoto Protocol were finalized in Marrakech in 2001. COP-7 established an Adaptation Fund under the Protocol and two funds under the Convention, the Least Developed Country Fund and the Special Climate Change Fund (see also 'The role of GEF' below). These funds were established separately, rather than simply increasing contributions to the GEF Trust Fund. The GEF effectively administers four funds. The SCCF includes other needs that adaptation, but adaptation has been prioritized in subsequent COPs.

COP-9 requested the GEF to support the implementation of NAPAs upon their completion, and requested the GEF to take a number of elements into account when developing operational guidelines for funding NAPA implementation, including: ensuring a country-driven approach, consistency with national priorities, cost-effectiveness and complementarity with other funding sources, equitable access by LDC Parties to funding, and criteria for supporting activities on an agreed full-cost basis, taking account of the level of funds available, guidelines for expedited support, urgency and immediacy of adapting to the adverse effects of climate change and prioritization of activities. But few implementation (Stage III) activities have taken place.

The core mandate of GEF has been to fund the incremental costs of global environmental benefits.[ix] The benefits of mitigation are clearly global, since everyone benefits from reduced emissions irrespective of where mitigation takes place. The impacts of climate change will vary from place to place, and the ability of poor communities to respond is the least, making them most vulnerable (IPCC 2000b). Some of the impacts of climate change can be reduced by taking preventive action, but these will depend on location. Increasing the capacity to adapt has significant co-benefits, but again these are largely local. The *causes* – emissions leading to increased concentrations to climate impacts – are global (Huq & Grubb 2003). The local nature of adaptation is at a different geographical scale to the mandate for global environmental benefits (Mace 2003).

The challenges facing the GEF in addressing adaptation is to include the local benefits of adaptation (and its specific increment above 'anyway' adaptation) in its global environmental mandate. A pilot programme to address this challenge is being launched during 2004 (see 'The GEF's role'). The bigger question relates to the mandate of the GEF. The GEF could either interpret global benefits more broadly to include local benefits of avoiding globally-caused damages (see, for example, GEF 2004b), or explicitly change its mandate to include local benefits. COP-8 asked the GEF "to continue to make the concept of agreed incremental costs and global benefits more understandable, recognising that the process for incremental costs should be transparent, flexible and pragmatic".

Development agencies, including the implementing agencies of the GEF, have considered adaptation in the context of poverty and identified 'mainstreaming' of adaptation as a key strategy (VARG 2003). The World Bank coordinates a Vulnerability and Adaptation Resource Group (VARG; www.climatevarg.org), as an informal network of bi- and multilateral institutions.[x] VARG aims to exploring the operational implications of adaptive capacity building and the integration of climate concerns in the development process and poverty

reduction strategies. The target audience are developing countries, the UNFCCC process, civil society, and development agencies.

Both adaptation and mitigation do not occur as discrete activities but often occur as part of *ongoing* activities. Countries anyway take measures to cope with natural climate variability, and are continually investing in activities (such as energy supply) that may emit more or less greenhouse gases. Analysis therefore is most realistic when it recognises that many adaptation and mitigation options involve adjusting the orientation of ongoing investment and other activities ('mainstreaming'), rather than being discrete actions with easily separated costs and benefits (Huq et al. 2003). The incremental benefits of adaptation are often not as clear as for mitigation projects, with many activities simply requiring better development planning. For example, adaptation might mean taking new flood lines into account in planning housing, or modifying water resource planning to take into account increased climate variability. These activities already occur and are best supported by integrated development planning (VARG 2003).

As adaptation activities can be capital-intensive and benefits highly localised and immediate, the real challenge will be the development of secure, adequate and predictable funding streams for priority adaptation needs, as well as equitable frameworks for access to this funding. Apart from funds, tiered national and regional insurance schemes have been proposed. They form part of an approach that emphasises managing and spreading the risk to developing countries of climate impacts such as extreme weather events, aiding recovery efforts and contributing to sustainable development.

5. NON-GEF FUNDING SOURCES AND CARBON MARKETS

Investment and funding for climate change activities comprise a larger set of sources, of which GEF funding is one part. Investment allocated to the CDM is of a similar scale to flows of GEF funding for climate change. As outlined above, there are 77 projects already developed, representing allocations worth $800 million for CDM investments or purchases of Certified Emission Reductions (CERs) (Ellis et al. 2004). Most of these allocations have been from public funds, but have not all been spent yet. There is a leveraging effect in that total project investment is higher than the fund contribution - so investment in actual projects should be about $800m times 6 to 8 (Sinha 2004). Total project investment can be expected to increase over time, including more private sector investment. Spending by the GEF, like CDM investment, can leverage significant additional investment, approximately by a factor of four (GEF 2002).

The GEF portfolio for climate change investments was $1.5 billion between 1991 and 2003, with an additional amount of US$5 billion from co-financing from bilateral agencies, recipient countries and private sector (Yamin & Depledge 2003a).

In the bigger context of international financial flows - total ODA in 2002 was US$61.9 billion and direct investment $49.8 billion[xi] – this investment is of a smaller order of magnitude. More specifically in the energy sector the World Energy Investment Outlook recently estimated that US$16 trillion would be needed in energy-supply infrastructure between 2001 to 2030 (IEA 2003). Of this, 60% or US$10 000 billion, is expected to be invested in the power sector and a further 19% in oil and gas. Almost half of the total investment is expected to be required in developing countries.

Initial investment allocation to the CDM were led by the World Bank's Prototype Carbon Fund (PCF) and the Dutch CERUPT tender, but several more funds have been established. Climate related funds are listed in Table 2, mostly government or intergovernmental.

Table 2: Major CDM investment allocations (Ellis et al. 2004)

Scheme	Coverage	Involvement	Amount
Austria	JI/CDM	Austrian government	EUR 72 m (2003-2006)
BioCarbon Fund	CDM/JI	Interest from governments (e.g. Canada) and companies.	$30-$50m

Community Development Carbon Fund	CDM	4 governments (Austria, Canada, Italy, Netherlands) and 7 companies (Japanese, German, Spanish, Swiss)	$40-70m
CERUPT	CDM	Dutch government	EUR 32.5 m
Denmark	JI/CDM	Danish government	EUR 120 m to 2007
Finland	CDM/JI	Finnish government	EUR 10m
Germany	JI/CDM	KfW (Federal government and states)	EUR 25m (to EUR 50m)
INCaF	CDM	Dutch government	EUR 44 m
Italian Carbon Fund	JI/CDM	Italian government (also open to contributions from Italian companies)	$20m (target $80m)
Japan carbon fund	CDM/JI	JBIC (Japan Bank for International Cooperation) and DBJ (Development Bank of Japan)	EUR 31.3m + EUR 23.5m
NCDF	CDM	Dutch government	$120-160m (32 Mt CO_2-eq.)
PCF	JI/CDM	6 governments (Canada, Finland, Netherlands, Norway, Sweden, Japan Bank for International Cooperation) and 17 companies	$180m

Sources: Pointcarbon November 2003, World Bank (undated) and Pinna 2003, Halich 2003, Sinha 2004, Mulders 2004

5.1 Carbon markets: EU emission trading system

A key development in carbon markets is the European Emissions Trading System (ETS). It is effectively a cap-and-trade system to limit CO_2 emissions from large industrial sources. The sectors covered are electricity (all fossil fuel generators over 20 MW), oil refining, cement production, iron and steel manufacture, glass and ceramics, and paper and pulp production. Sectors will be reviewed in 2006 and smaller installations can 'opt in' from 2005-07. Targets must be in line with European countries' domestic implementation of Kyoto commitments (CEC 2001).

Central to the implementation of the ETS are national allocation plans, to be developed by March 2004. These plans will set targets for the relevant sectors and allocate allowances (each worth 1 tonne CO_2), effectively setting absolute emission caps for installations for the relevant periods. There will be penalties for non-compliance. These allowances will be tradable, and a 'linking directive' will allow units from CDM and JI projects (subject to some conditions) to be substituted for allowances.

The ETS will create significant financial flows, in particular prior to the entry into force of the Kyoto Protocol. Should the Kyoto Protocol not enter into force at all, the ETS might still be applied an implemented by a "Friends of Kyoto" group – which could include a broad range of developing countries, and major industrialized ones (the enlarged EU, Canada, Japan, Norway, Switzerland, New Zealand). The ETS also will recognize credits from emission trading schemes set up elsewhere, specifically mentioning the US states of California and Oregon (De Roo 2004).

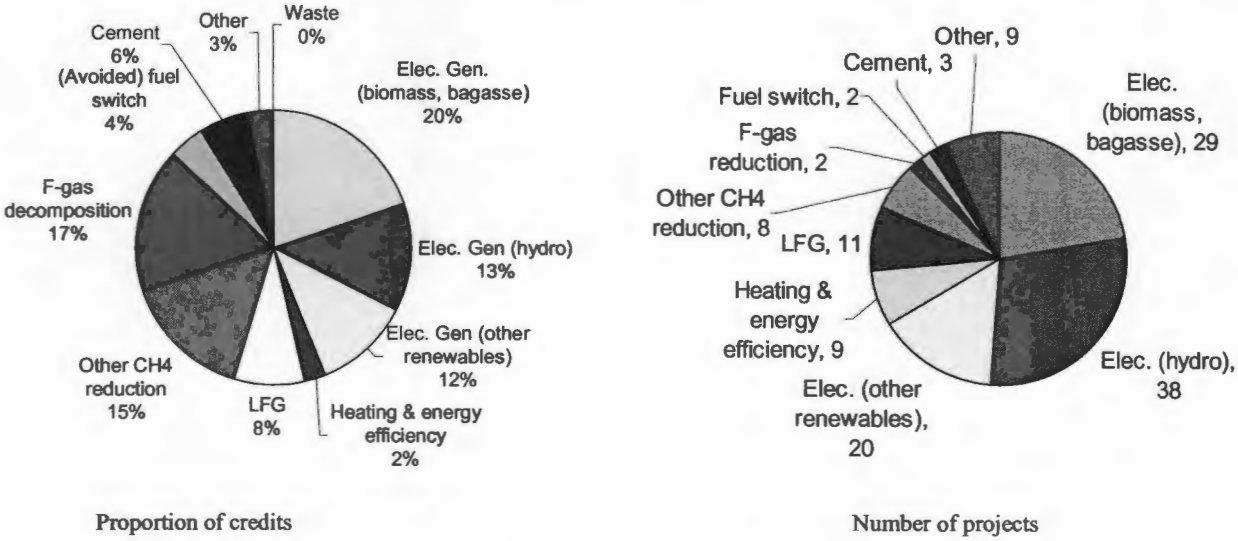
5.2 The Clean Development Mechanism (CDM)

The CDM is another major development in carbon markets, with about $800 million invested so far (see above). The CDM emerging portfolio has the largest share of credits from F-gas decomposition (HFC, 17% of CERs) and landfill gas (LFG) projects (23%). The single HFC project is boosted by the very high global

warming potential, while methane capture is relatively popular. Measured by the number of projects, hydro-electricity is the most popular project type, but the emission reductions per project are lower.

Figure 4: CDM portfolio – relative importance of different sectors (Ellis et al. 2004)

Sources: Project documentation



While the CDM portfolio makes for an interesting comparison with the GEF mitigation portfolio, it must be noted that it is only just emerging. Its shape may well change, influence by the maturing of the CDM institutions themselves, competition from JI projects and assigned amounts, the influence of the European ETS and its link to the CDM and other factors.

6. NON-GEF PROJECT-BASED RESPONSES

Mitigation efforts can be facilitated by carbon markets, as described above. Eventually, however, mitigation must be implemented through programmes and projects. The CDM, a project-based mechanism, generates credits that are tradable ('fungible' in climate jargon) in the international emissions trading system under Article 17 of the Kyoto Protocol. The CDM Executive Board is accrediting operational entities, formulating methodologies and considering the first round of project submissions under provision for a 'prompt start'. National Action Plans and project rules are defining mitigation actions for the European ETS. . A wide range of actors – Kyoto Parties, US states, individual companies, brokers and international financial institutions – are becoming involved in mitigation programmes. GEF investment in mitigation takes place in the broader context of these efforts.

6.1 Experiences with mitigation programmes and projects

Prior to the Marrakech Accords, **Parties to the Convention** piloted mitigation programmes under the notion of 'Activities Implemented Jointly' (AIJ). Initiated at COP-1 in 1995, this pilot phase explicitly did not award carbon credits, and included both developing countries and economies in transition. The main aim was to gain experience with mitigation projects, and more than 150 projects were registered in over 40 countries (see http://unfccc.int/issues/aij.html). The future of these pilot projects under the CDM and Article 6 JI remains unclear. The US launched its own (IJI) programme as part of AIJ in 1993. The last round of projects were approved in 2000. Some 50 mitigation projects were funded under this programme (see www.usiji.gov).

Among **Kyoto Parties**, early movers in the CDM have included the Dutch government through ERUPT (JI) and CERUPT (CDM); World Bank through the Prototype Carbon Fund (see section on the CDM above).

Some of these funds aim at particular niches, e.g. the Community Development Carbon Fund aimed at small-scale mitigation projects that also improve the livelihoods of local communities, and the BioCarbon Fund for LULUCF mitigation projects combined with environmental benefit, adaptation and poverty reduction.[xii] Investment by early movers in the CDM is at least in part intended to influence the future market by setting *de facto* technical standards and occupying market position (Lazarus & Kartha forthcoming).

Joint Implementation (JI) under Article 6 of the Protocol[xiii] allows investment in projects in countries with economies in transition. The fundamental difference to the CDM is that in this case, both countries have caps on their national emissions under Kyoto. The overall limitations mean that any errors in estimating real emission reductions at the project level would reflect in the national GHG registries (in as far as these are accurate).

Developing countries, while not formally required to meet quantified mitigation targets, are taking significant action (Shukla et al. 2002; Davidson et al. 2003; Heller & Shukla 2003). Emissions intensity in China has decreased considerably in recent years, almost 50% since 1990 (GGI 2004), partly in order to save scarce energy and partly due to efforts to reduce local air pollution. Policies have included a reduction in coal and oil subsidies between 1990 and 1995. China has also introduced tax incentives for constructing energy-efficient buildings, and now requires that all industrial boilers cogenerate electricity with their waste heat. India has developed a domestic wind industry and has in the past provided leadership in the climate negotiations.

National programmes have been established to pilot mitigation projects. Canada ran a GHG Emissions Reduction Trading (GERT) pilot programme throughout the country from 1998 to 2002. Ten project proposals were reviewed in a multi-stakeholder process and 5 registered for trade. GERT established mandatory review criteria and drew a lessons from the experience in a detailed report (see www.gert.org). Lessons included that "policy decision and rules are required" on technical issues to ensure effective trading programmes.

Sub-national governments are engaging in climate mitigation as well as national governments. Oregon and Washington states have established a CO_2 Standard and Climate Trust. Under the Trust, new electricity generation sources must meet a CO_2 standard. Beyond a threshold of 0.675 lbCO2/kWh, developers must either purchase project-based credits directly to off-set their commitments, or pay a fixed fee to the Trust. So far over $5 million invested via Climate Trust (www.energy.state.or.us/siting/rules.htm; www.climatetrust.org). The Climate Trust has undertaken two rounds of public solicitation of offsets, already contracting 2.5 million tCO2 over 20 years (Lazarus & Kartha forthcoming).

There is substantial experience in US states with programmes that focus on reducing local air, water and other pollution, with the (uncredited) co-benefit of reducing GHG emissions. These include Emissions Reduction Credit (ERC) trading under the Clean Air Act, which allows projects at existing emissions sources to help new sources meet emission standards for criteria pollutants.[xiv] Similarly, the Discrete Emission Reduction (DER) programme is used by 6 US states to enable compliance with State Implementation Plans for air pollution. The California South Coast Air Quality Management District established a Regional Clean Air Incentives Market (RECLAIM) for large point sources of NO_x and SO_x, and allowed projects to claim retrospective credits for emission reductions already achieved at non-controlled sources (REF ELI).

A city like Seattle has established a 'GHG Target and Offset Program', also known as Seattle City Lights. The target is net zero electricity supply. Project-based credits can be purchased from any location, although Washington State is preferred, and the expectation is that 400 000 tCO_2 per year will be purchased (http://seattle.gov/light/News/RFI_RFP/RFP_ggm.asp).

The Chicago **Climate Exchange** has set voluntary targets for participants. There is a limited role for offsets in North America , but foreign locations for projects (in addition to the US) are permitted, including Brazil, Canada. The CCX was scheduled to start in 2003 and run until 2006 (www.chicagoclimateexchange.com)

More forward-looking **companies** are implementing voluntary GHG emission reduction plans, e.g. some motor companies have increased their sales of hybrid vehicles. European companies need to meet regulations under the ETS and thus are taking GHG emissions into account in investment strategy. Companies like TransAlta a major coal-based electricity producer in Canada have set targets and begun acquiring carbon

credits as a learning and risk management strategy in anticipation of future regulation. Emissions **brokers** and project developers like CO2e.com, Natsource, Econergy, and now various accounting and engineering firms have also developing funds, and pooled approaches to building project-based mitigation portfolios (Lazarus & Kartha forthcoming).

Many non-governmental organizations (**NGOs**) in both industrialized as well as in developing countries are extremely committed to promoting action on climate change. They provide excellent information, analysis and advocacy.

In addition to investment in mitigation projects, significant work has been undertaken in establishing effective **standards, registries and reporting systems**. The World Resources Institute (WRI) and the World Business Council on Sustainable Development (WBCSD) have established a GHG Protocol (www.ghgprotocol.org). Since developing its widely-used Corporate GHG Accounting and Reporting Standards for organizational inventories, they are nearing completion of their first Standards and Guidelines document for project-based mitigation activities. The environmental NGO sector has produced a CDM Gold Standard to ensure a higher quality of mitigation projects from the point of view of sustainable development (www.panda.org/downloads/climate_change/thegoldstandardoverview.doc). Other standards include NESCAUM (http://www.nescaum.org/Greenhouse/Registry/state_matrix.html) and the Climate Registry (http://www.climateregistry.org/).

Despite all these efforts, it is clear that global emissions are continuing to increase. World emissions have risen by 14% between 1990 and 2000 (WRI 2003) – and have continued to rise since – even with the economic collapse and concomitant emissions reductions in Russia and other countries of the former Soviet Union, and even with the adoption of international agreements on climate change. While this may be a slightly slower rate than 'business as usual', it is a barely marginal improvement.

Voluntary actions are not sufficient to deal with the scale of the problem, which requires major changes particularly to future energy systems. Addressing climate change effectively requires major transformations in the way we produce and consume energy. The GEF climate change programme clearly has a role to play.

6.2 Lessons

Project-based mitigation in developing countries poses particular challenges when linked to trading. Not only is there a need for measuring GHG emissions through inventories and keeping track of reductions through registries, but there is a challenge of estimating what would have occurred were it not for the mitigation project or programme. This distinction between the actual project and the estimate of the baseline (or 'counter-factual') raises a host of challenging and inter-related technical issues, such as additionality, baselines, leakage, and permanence (Lazarus & Kartha forthcoming). To the extent that GEF mitigation projects do not result in any credits for trading and are not used for compliance with Kyoto targets by Annex I Parties, this complexity can be avoided.

Some important lessons emerge from these project-based programmes. System administrators face a common set of challenges related to maintaining a functioning market while ensuring the credibility of the credits generated by the programme – particularly if it is linked to trading. The intangible nature of the commodity being traded – emission reductions against a hypothetical baseline – means that comparisons with other traded goods are limited. Clear rules for the market are important, since they give value to the commodity. Up to now, much of project-based mitigation has been conducted in expectation of future markets (Lazarus & Kartha forthcoming). GEF mitigation projects can draw on these experiences.

7. THE ROLE OF THE GEF IN SUPPORTING THE UNFCCC AND KYOTO PROTOCOL

The GEF was formed in the lead-up to the Rio Earth Summit in 1992, to respond to the needs of various environmental Conventions for a financial mechanism. It is the main channel of funding for developing countries[xv] under the UNFCCC. There are three implementing agencies: UNEP, UNDP, and the World Bank. A legal Instrument governs the GEF, and a Memorandum of Agreement between the GEF Council

and the COP was agreed at COP-1. The GEF Council – with 16 members from developing countries, 14 from developed countries and 2 from economies in transition - develops, adopts and evaluates programs.

Although the term financial mechanism and the GEF are sometimes used interchangeably, the term 'financial mechanism' correctly refers to the totality of legal, institutional and procedural arrangements that regulate and make possible the flow of financial resources mandated by the Convention. The purpose of the financial mechanism is to give effect to the resource commitments set out in Articles 4.3, 4.4 and 4.5 of the Convention. The purpose of the GEF is broader – it supports the Convention but it can also fund climate activities outside of the Convention's framework as well as its other focal areas (Yamin & Depledge 2003a: 19).

7.1 Financial mechanism of the UNFCCC

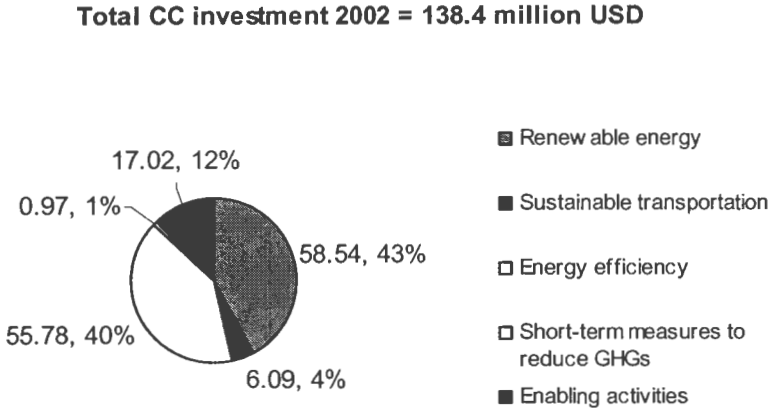
GEF's role in climate change is well defined as the financial mechanism of the UNFCCC and the Kyoto Protocol. Article 11 of the FCCC establishes a financial mechanism, which can be entrusted to one or more international entities with "an equitable and balanced representation of all Parties within a transparent system of governance". The COP has entrusted the operation of the financial mechanism to the GEF, initially on an interim basis and since 1999 on a continuing basis. The financial mechanism is accountable to the COP, which reviews the mechanism every four years. The COP provides guidance on all policies, programme priorities, and eligibility criteria. The current major GEF programmes and strategic priorities are outlined in chapter 3.

The Kyoto Protocol, in its Article 11, refers back to the financial mechanism of the Convention and applies the same guidance. The Protocol directs the financial mechanism to 'provide new and additional financial resources to meet the agreed full costs' of Protocol Article 10 / FCCC Article 4.1a (reporting on inventories, emission factors etc). Developed parties are to provide the 'agreed full incremental costs' of items in Protocol Article 10, which include mitigation and adaptation programmes.

7.2 GEF mitigation funding

The role of the GEF in supporting the Convention as a financial mechanism is unique. GEF plays a particular role in that its programmes are focused specifically on climate change. The vast majority of GEF climate change funding of $1.5 billion has supported mitigation projects (UNFCCC 2002: FCCC/SBI/2002/14).[xvi] Each of the four operational programmes relates to mitigation - energy efficiency (EE) , renewable energy (RE), sustainable transport, and reduction of cost of low GHG-emitting technologies. Figure 5 shows the breakdown of spending in major areas in 2002, including enabling activities. The six strategic priorities have also been mitigation-focused,[xvii] although a seventh strategic priority on adaptation has been added since COP-9.

Figure 5: GEF climate change investments (2002)



The scale of investment is comparable to the CDM, but smaller than development funding or foreign direct investment (see above). While the scale of funds is not the largest, it has the potential to leverage other investments through co-financing by a factor of four (GEF 2002). An example is the 'Five Million Fund' administered by the GEF, which provides reliable financing to leverage private investment for renewable energy in remote locations. The fund aims to link climate protection and poverty reduction, providing five million households with renewable energy through a partnership approach. The usual modus operandi of GEF has been subsidising investment costs for renewable energy projects, but it has also tested a range of new approaches to financing. These include contingent grants, revolving funds, private equity approaches, loans and guarantees (GEF 2004a). Such approaches play an important role in mobilising private investment.

Larger streams of funding often focus on broader aspects of sustainable development. In the overall debate whether the climate convention should address sustainable development overall, or focus on climate change in particular, GEF has a focused role. Financial leverage can be entirely for global environmental benefits, or for development benefits, or both. It is critical to the global effort in climate change mitigation and adaptation.

7.3 GEF adaptation funding

The earliest guidance given to the GEF, at COP 1 in Berlin, provided for a staged-approach to adaptation (Decision 11/CP.1)(1995). In this decision, the financial mechanism was asked to consider criteria for supporting planning and studies of climate change impacts under the first stage. The second stage progresses onto measures to prepare for adaptation. The third, and most advanced stage, is concerned with measures to facilitate adaptation. The staged approach has influenced activities that received GEF support under NAI National Communications.

At COP-7, Parties agreed there was a need for new and additional funding beyond contributions which are allocated to the climate change focal area of the GEF and to multilateral and bilateral funding for the implementation of the Convention. The scope of activities eligible for funding was also included. The LDC fund and SCCF were established under the Convention, and the Adaptation Fund under the Protocol. All three funds are to be operated by the GEF on the basis that each fund remains distinct from the existing GEF Trust Fund used for climate change activities which shall remain in operation.

Many assessment and planning activities have already been funded by GEF, and the challenge is to define concrete implementation activities. Significant progress has been made, notably in prioritizing adaptation activities through a participatory process of the National Adaptation Programme of Action (NAPA) by LDCs. Under the LDC Trust Fund, GEF has provided $200 000 per LDC, and these are conducted in a participatory process, with preliminary results expected from 2005 onwards.

COP-7 agreed to establish the Special Climate Change Fund (SCCF) under the Convention to finance adaptation, technology transfer, projects in a number of sectors (transport, industry, agriculture, forestry and

waste management); and "activities to assist developing country Parties referred to under Article 4.8 (h) in diversifying their economies". COP-8 gave further guidance that this funding should be complementary to other funds administered by GEF.

The Adaptation Fund operates under the Protocol, and would receive guidance from the COP/MOP once the Protocol enters into force, but until then from the COP. It will be financed by a share of the proceeds from CDM projects (2%) as well as other sources.

In response to guidance from COP-7, the GEF Council approved in November 2003 a seventh strategic priority on adaptation, "Piloting an Operational Approach to Adaptation" (SPA), within the GEF Trust Fund. The scheme is limited to pilot projects worth $50 million during 2005-07. Pilots should show how adaptation planning and assessment can be practically translated into projects that will provide real benefits. Full costs are to be paid only for small grants, while large and medium projects will require co-financing. The pilot begins in July 2004 and will end when the LDC and SSC Funds start. Adaptation has precedence in both these funds, with COP 9 providing guidance to the GEF for the operation of the Special Climate Change Fund (SCCF) – prioritising adaptation and technology transfer.

A paper on 'assistance to address adaptation' for the GEF Council in May 2004 indicates that adaptation activities must be country-driven and integrated into national sustainable development planning and poverty-reduction strategies (GEF 2004b). It links local adaptation to GEF's mandate in that the "need to adapt to adverse impacts of climate change is an incremental burden to developing countries, generated by a global environmental impact". Capacity building can be incremental and targeted, and also have "a global dimension as they help vulnerable countries and communities to address the global environmental impact of climate change" (GEF 2004b).

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Endnotes

[i] The IPCC reports these projected changes in degree Centigrade, rounded to the nearest 0.05°C per unit time. In Fahrenheit, the changes would be time 9/5, i.e. 1.1 °F ± 0.4°F

[ii] Similarly, IPCC reports sea-level rise in cm. Converting by 1 cm = 2.54 inches, the projected range of increase is 6 – 37 inches.

[iii] In the latest IPCC assessment (IPCC 2001a), the analysis is presented differently: Reductions in greenhouse gas emissions and the gases that control their concentration would be necessary to stabilize radiative forcing. For example, for the most important anthropogenic greenhouse gas, carbon cycle models indicate that stabilization of atmospheric CO2 concentrations at 450, 650, or 1,000 ppm would require global anthropogenic CO2 emissions to drop below the year 1990 levels, within a few decades, about a century, or about 2 centuries, respectively, and to continue to decrease steadily thereafter (see Figure SPM-6 in the TAR summary for policy makers). These models illustrate that emissions would peak in about 1 to 2 decades (450 ppm) and roughly a century (1,000 ppm) from the present. Eventually CO2 emissions would need to decline to a very small fraction of current emissions.

[iv] Collectively, Annex I countries did reduce their emissions over the 1990s by about 1%, but this was primarily due to economic stagnation in the former Soviet Union (GGI 2004).

[v] Industrialized countries are listed in Annex B to the Protocol, but with few exceptions this is the same as the Convention's Annex I. However, Article 3 of the Protocol specifies that Annex I Parties shall ensure that their CO_2-equivalent do not exceed their assigned amount – listed in Annex B of the Protocol.

[vi] The terms rapidly industrializing countries (RIDCs) can be loosely defined as developing countries having relatively rapid industrial growth in the last decade and relatively high income. Recent analysis (Ott et al. 2004) defines them as countries with higher per capita GDP-PPP than Non-Annex I average and with higher than 2 percent annual growth in 1991-2000. The 37 Rapidly Industrialising Developing Countries (RIDCs) identified (Ott et al. 2004) were Algeria, Antigua & Barbuda, Argentina, Bahamas, Barbados, Belize, Bosnia & Herzegovina, Botswana, Brazil, Chile, China, Colombia, Costa Rica, Cyprus, Dominican Republic, El Salvador, Fiji, Grenada, Guyana, Iran, Jordan, Lebanon, Malaysia, Malta, Mauritius, Mexico, Oman, Panama, Peru, Philippines, Saint Kitts & Nevis, Saint Lucia, Saint Vincent & Grenadines, South Africa, Thailand, Tunisia, and Uruguay.

[vii] The 15 Newly Industrialised Countries (NICs) identified (Ott et al. 2004) were Bahrain, Brunei*, Cuba, Israel, Kazakhstan, Korea (South), Kuwait, Qatar, Saudi Arabia, Singapore, Suriname, Trinidad & Tobago, Turkmenistan, United Arab Emirates and Uzbekistan. *: non-Party to the UNFCCC.

[viii] "Sink" means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere (UNFCCC 1992: Article 1 Definitions).

[ix] The term 'global environmental benefits' is not mentioned in the FCCC, but the Instrument establishing the GEF.

[x] The following agencies are currently participating in this knowledge exchange: ADB, BMZ, CIDA, DFID, DGIS, EC, GEF, GTZ, KfW, OECD, Red Cross/Red Crescent (Climate Center), USAID, UNDP, UNEP, USEPA, the World Bank and World Health Organization.

[xi] OECD DAC - Creditor Reporting System 2004.

[xii] See http://carbonfinance.org/cdcf/home.cfm and http://carbonfinance.org/biocarbon/home.cfm.

[xiii] Note that Article 6 Joint Implementation is more restricted in scope than the AIJ pilot programme, since the CDM effectively combined the Brazilian proposal for a Clean Development Fund with the concept of project-based joint implementation. Developing countries cannot participate in JI under Article 6.

[xiv] For and instance, (carbon monoxide, lead, nitrogen oxides (NOx, sulfur dioxide (SO_2), volatile organic compounds (VOCs), particulates).

[xv] Economies in transition (EITs) who are part of Annex I, such as Russia, cannot receive funding through the financial mechanism, which is for 'developing countries'. However, EITs can still receive funding from GEF, but outside its role as the financial mechanism (Yamin & Depledge 2003a).

[xvi] The overall funding for GEF has been (dates in brackets, followed by total amounts pledged) for the pilot Phase (1990–1994) – US $ 1.13 billion; First Replenishment (1995–1998) US $ 2 billion; Second Replenishment (1998–2002) US $2.75billion; and Third Replenishment (2002–2006) US $3 billion.

[xvii] The six strategic priorities have been: Transformation of markets for high-volume, commercial low-GHG products or processes; power sector policy frameworks supporting RE and EE, increased access to local sources of financing; productive uses of RE; global market aggregation and national innovation for emerging technologies; and modal shift in urban transport and clean vehicle / fuel technologies.

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Climate Change Overview

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Final draft
Input to an evaluation of the
GEF climate change programme

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