

## Mitigating climate change

Mitigating climate change and its impacts lies at the heart of the Convention's objective. Stabilizing GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, which is the ultimate objective of the Convention (see chapter 1), can be achieved in two ways. The first is by limiting or, as appropriate, reducing anthropogenic GHG emissions by **sources** and the second by preserving or, as appropriate, enhancing **sinks and reservoirs** of GHGs.

For the purposes of the Convention, Article 1 defines a **source** as “any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere”; a **sink** as “any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere” and a **reservoir** as “a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored”. **Climate system** is defined as the totality of the atmosphere, geosphere, hydrosphere and biosphere and their interactions, thus including not only the atmosphere, but also earth, water, and living organisms.

This chapter discusses the provisions and activities related to mitigation under the climate change process. Section 11.A addresses commitments relevant to all Parties, while section 11.B addresses those that are relevant specifically to Annex I Parties; section 11.C refers to activities by non-Annex I Parties in connection with their national communications; and section 11.D reviews other areas. Some aspects of the Kyoto Protocol that are closely related to the topics discussed in this chapter are addressed in Box 11.2 (Kyoto flexibility mechanisms), Box 11.3 (LULUCF) and Box 11.4 (core elements of the Kyoto Protocol). Box 11.5 addresses the so-called Brazilian proposal for distributing emission targets on the basis of historical contributions to climate change.

### 11.A. Measures to mitigate climate change: all Parties

#### 11.A.1. General policy aspects of mitigation

Article 3.3 stipulates that Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. In order to ensure global benefits at the least possible cost, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of GHGs and adaptation (see chapter 12) and comprise all economic sectors. In addition, they may be carried out cooperatively by interested Parties.

The Convention addresses the full range of GHGs with the exception of those which are already controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer (see chapter 4 on the Montreal Protocol and chapter 18 on relevant gases).

General commitments of Parties to mitigate climate change are included in Article 4.1 (for all Parties) and more specific commitments are in Article 4.2 (for Annex I Parties). The Convention draws attention to the different needs and

capacities of Parties in the implementation of the commitments contained in Article 4.1. The article is premised on the need to take into account Parties' "common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances". Article 4.2(a) also calls for differentiation among the Annex I Parties, stating that account should be taken of "the differences in these Parties' starting points and approaches, economic structures and resource bases, the need to maintain strong and sustainable economic growth, available technologies and other individual circumstances".

Article 4.1(b) calls on all Parties to "formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing **measures to mitigate climate change** by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol".

On **sinks and reservoirs**, Article 4.1(d) calls on Parties to "promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems".

Article 4.1(f) requires Parties to "take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions". It also calls on Parties to "employ appropriate methods, for example impact assessments, formulated and determined nationally", with a view to minimizing adverse effects that projects or measures undertaken in the context of mitigation could have "on the economy, on public health or on the quality of the environment".

Article 4.1(h) requires Parties to promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies.

Article 4.7 requires that to the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties.

#### ***11.A.2. Scientific, technical and socio-economic aspects of mitigation***

Scientific, technical and socio-economic aspects of mitigating climate change are now discussed as a separate item on the SBSTA's agenda. During the consideration of the Third Assessment Report (TAR) of the IPCC by SBSTA 16 (June 2002), mitigation was one of three areas identified for regular consideration. Up to SBSTA 19 (December 2003), it was treated together with

“Scientific, technical and socio-economic aspects of impacts of, and vulnerability and adaptation to, climate change” (see chapter 12), as a sub-item of the consideration of the TAR. At that session, the SBSTA completed its consideration of the TAR. SBSTA 20 (June 2004) started to consider mitigation and adaptation as two separate new agenda items<sup>42</sup>. The work on these issues was also endorsed by COP 9 in 2003, which asked the SBSTA to report on it to COP 11, and to focus on exchanging information among Parties on practical ways of helping implement the Convention (decision 10/CP.9).

SBSTA 19 noted that relevant themes for consideration under the two new agenda items included: sustainable development, opportunities and solutions, and vulnerability and risk, and mandated workshops on each item during SBSTA 20. SBSTA 20 identified two topics for further consideration under mitigation:

- technology innovation, deployment and diffusion, including identification and removal of barriers; and
- practical opportunities and solutions that contribute to sustainable development.

SBSTA 21, SBSTA 22 and SBSTA 23 continued to consider these topics. SBSTA 23 asked the secretariat to organize workshops at its next sessions, on the following themes:

- agriculture, forestry and rural development (in-session, SBSTA 24 (May 2006));
- urban planning and development, including transportation (in-session, SBSTA 25 (November 2006));
- energy efficiency, including industry, and residential and commercial end-use (pre-session, SBSTA 26 (May 2007));
- power generation, including clean fossil fuels and renewable energy (pre-session, SBSTA 26);
- non-CO<sub>2</sub> emissions, including methane recovery and use (in-session, SBSTA 27 (December 2007)).

Aspects to be considered at each workshop include:

- currently available and emerging technologies, including small-scale ones, and the associated potential to reduce emissions; opportunities and best practices to promote, and to overcome barriers to, innovation, deployment, transfer and diffusion of these technologies, including through innovative financing;

<sup>42</sup> Views submitted by Parties on these two areas can be found in FCCC/SBSTA/2003/MISC.2 <<http://unfccc.int/resource/docs/2003/sbsta/misc02.pdf>> (synthesized in FCCC/SBSTA/2003/2 <<http://unfccc.int/resource/docs/2003/sbsta/misc02.pdf>>), FCCC/SBSTA/2003/MISC.2/Add.1 <<http://unfccc.int/resource/docs/2003/sbsta/misc02a01.pdf>>, FCCC/SBSTA/2004/MISC.6 <<http://unfccc.int/resource/docs/2004/sbsta/misc06.pdf>> and FCCC/SBSTA/2004/MISC.6/Add.1 <<http://unfccc.int/resource/docs/2004/sbsta/misc06a01.pdf>>.

- international cooperative efforts to promote innovation, deployment, transfer and diffusion of technology, and opportunities to enhance such cooperation;
- socio-economic aspects of mitigation, such as costs and benefits, co-benefits, spillover effects and “win-win” practices that contribute to sustainable development;
- cross-cutting aspects and methods and tools for assessing mitigation opportunities.

Based on the outcomes of the workshops and views submitted by Parties, the SBSTA will take stock of its work on this issue at its twenty-seventh session and report to COP 13. Presentations and other information presented at the workshops organized until now can be found on the UNFCCC web site <[http://unfccc.int/methods\\_and\\_science/mitigations/items/2681.php](http://unfccc.int/methods_and_science/mitigations/items/2681.php)>.

**Relevant COP decision:**

Decision 10/CP.9: Scientific, technical and socio-economic aspects of impacts of, and vulnerability and adaptation to, climate change, and of mitigation

**11.B. Measures to mitigate climate change: Annex I Parties**

***11.B.1. Mitigation and related communication commitments***

Specific commitments by Annex I Parties to mitigate climate change are laid down in Article 4.2. According to Article 4.2(a), each Annex I Party “shall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs”. The article further states that “the return by the end of the present decade [i.e. the 1990s] to earlier levels” of anthropogenic GHG emissions would contribute to modifying longer-term trends in these emissions consistent with the objective of the Convention, an undertaking in which Annex I Parties are called upon to take the lead.

In addition, Article 4.2(b) stipulates that Annex I Parties “shall communicate detailed information” on their policies and measures that aim to return their GHG emissions individually or jointly to their 1990 levels. Taken together, these provisions have been interpreted to add up to the non-legally binding aim of returning GHG emissions of Annex I Parties to their 1990 levels by the year 2000.

The information mentioned in Article 4.2(b) is to be communicated by the Party “within six months of the entry into force of the Convention” and “periodically thereafter” in the context of the national communications further defined by Article 12 (see chapter 18).

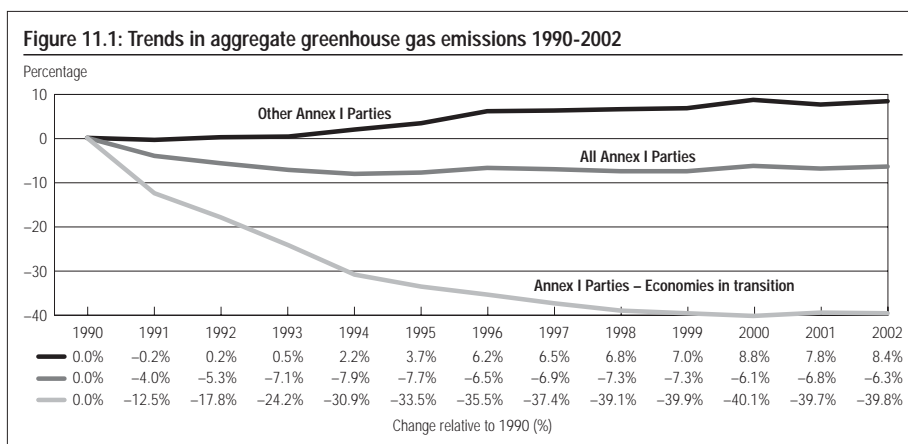
Communications have also to provide estimates of the effects which the policies and measures will have on anthropogenic GHG emissions by sources and removals by sinks. These communications are to be submitted “during the period referred to in Article 4, paragraph 2(a)” i.e. by the end of the 1990s. Subsequent guidance by the COP has provided for Parties submitting estimates for later years too (see chapter 18). The secretariat, in its last compilation and synthesis report of

Annex I Parties' third national communications<sup>43</sup>, noted that Parties had reported policies and measures which covered all the important sources of emissions much more comprehensively than previously. There was a clear indication of a shift towards implementing new climate-specific policies and measures, such as emissions trading, carbon taxes and green certificate trading. The greatest number of policies and measures reported were in the energy sector.

As noted in this report, the total aggregated GHG emissions of all reporting Annex I Parties had "decreased by about 3 per cent from 1990 to 2000". Thus Annex I Parties have jointly attained the aim of Article 4.2 of the Convention – to return their 2000 emissions to 1990 levels. Furthermore, in a subsequent publication<sup>44</sup>, the sizeable emission reduction of developed countries, taken as a group, was confirmed. Compared to 1990 levels overall GHG emissions of these countries were down by 5.9 per cent in 2003. However, the extent to which Annex II Parties succeeded in reversing an increasing trend in GHG emissions varied widely<sup>45</sup>.

According to Article 4.2(g), any Party not included in Annex I may at any time notify the Secretary-General of the United Nations, as the Depositary of the Convention, that it intends to be bound by Article 4.2(a) and 4.2(b). Such notifications have been made by Croatia, the Czech Republic, Kazakhstan, Liechtenstein, Monaco, and Slovakia. With the exception of Kazakhstan, however, the notifications have lost their significance because the other countries have been included in Annex I (see chapter 9).

Article 4.2(d) states that the COP is to review the adequacy of Article 4.2(a) and (b) at its first session, as well as at further sessions. For more detail on this provision and its implementation, see section 11.B.6 below.



<sup>43</sup> FCCC/SBI/2003/7 <<http://unfccc.int/resource/docs/2003/sbi/07.pdf>>.

<sup>44</sup> Key GHG data, Greenhouse gas emissions data for 1990-2003 submitted to the United Nations Framework Convention on Climate Change, November 2005, <[http://unfccc.int/resource/docs/publications/key\\_ghg.pdf](http://unfccc.int/resource/docs/publications/key_ghg.pdf)>.

<sup>45</sup> FCCC/SBI/2003/7/Add.1, paragraph 189 <<http://unfccc.int/resource/docs/2003/sbi/07a01.pdf>>.

Article 4.6 calls on the COP to allow the **countries with economies in transition** (EITs; see chapter 3) “a certain degree of flexibility” in implementing their commitments under Article 4.2. This includes the historical level of GHG emissions chosen as a reference. The provision is intended to take account of the economic and political upheavals experienced by these countries in the late 1980s and early 1990s which led, among other effects, to unusual decreases in GHG emissions. Several EITs made use of the option for flexibility on the base year. Bulgaria and Hungary made declarations regarding Article 4.6 when they ratified the Convention, with Bulgaria choosing 1988 as base year and Hungary applying the average

#### Box 11.1: Major objectives of climate change policies of Annex I countries

Though the circumstance of Annex I countries may be different they generally have similar overall objectives of their policies on climate change.

##### Energy

- Economically efficient supply and use of energy
- Diversification of energy sources leading to enhanced security of supply
- Protection of the environment, in particular the management of air quality
- Energy sector reform to increase economic efficiency by introducing more private sector participation, more competition in supply and distribution, and increased consumer choice over energy suppliers
- Efficient use of resources, including energy resources, through green tax reform
- Climate change mitigation through emissions trading

##### Transport

- Sustainable development
- Air-quality management
- Congestion management
- Energy security

##### Industrial processes

- Reduction of gases emitted as by-products
- Improved efficiency
- Minimization of the use and emission of fluorinated gases

##### Agriculture

- Improved environmental performance such as preventing pollution of underground waters
- Greater sustainability through, among other things, improved food quality, rural development, organic farming and land-use planning

##### Land-use change and forestry

- Protection and sustainable management of forests
- Conservation of biodiversity, wildlife, soil and water
- Afforestation and reforestation to increase sink capacity

##### Waste

- Reducing the impact of waste on air, soil and underground waters
- Recycling and minimizing waste

of the 1985–1987 period. In addition, COP 2 approved modified base years for two other countries, Poland (1988) and Romania (1989)<sup>46</sup>. In 1998, COP 4 approved 1986 as base year for Slovenia<sup>47</sup>. In 2005, at the request of Croatia, COP 11 asked the SBI to consider the level of GHG emissions for the base year of Croatia and the exact nature of the flexibility allowed to that Party<sup>48</sup>. All other Annex I Parties use 1990 as base year.

#### **11.B.2. Activities implemented jointly in the pilot phase (AIJ)**

Referring to the principle of cost-effectiveness, Article 3.3 of the Convention states that efforts to address climate change may be carried out cooperatively by interested Parties. Article 4.2(a) explains that Annex I Parties may implement mitigation policies and measures “jointly with other Parties and may assist other Parties in contributing to the achievement of the objective of the Convention” and, in particular, the objective of Article 4.2(a) to modify longer-term emission trends. Furthermore, Article 4.2(d) provides that the COP, at its first session, shall “take decisions regarding criteria for joint implementation”.

At its first session in 1995, the COP launched a “pilot phase” of AIJ (decision 5/CP.1). In this phase, Parties may, on a voluntary basis, implement projects that reduce GHG emissions, or enhance removals of GHGs through sinks, in the territories of other Parties. The reductions in emissions of these projects must exceed those which would have occurred otherwise. However, no credits (or emissions reduction units; see Box 11.2) may accrue to any Party for such reductions or removals. During the pilot phase AIJ may take place “among Annex I Parties and, on a voluntary basis, with non-Annex I Parties that so request it”. The aim is to gain experience through learning by doing, for example in establishing baselines and estimating the environmental benefits of a project.

Decision 5/CP.1 also makes clear that AIJ between Annex I Parties and non-Annex I Parties will not be considered as fulfilling current commitments of Annex I Parties under Article 4.2(b) (on limiting emissions), but could contribute to achieving the objective of the Convention and to fulfilling commitments of Annex II Parties under Article 4.5 (on technology transfer). Furthermore, AIJ “are supplemental, and should only be treated as a subsidiary means of achieving the objective of the Convention”. They do not modify the commitments of each Party. The financing of AIJ has to be additional to the financial obligations of Annex II Parties under the Convention (related to the financial mechanism), as well as to current official development assistance (ODA) flows.

Parties are encouraged to report on their AIJ under the pilot phase using a Uniform Reporting Format (URF). The latest version of the URF was adopted at COP 8 in 2002 (decision 20/CP.8), replacing the first URF, adopted at

<sup>46</sup> Decision 9/CP.2.

<sup>47</sup> Decision 11/CP.4.

<sup>48</sup> Decision 10/CP.11.

COP 3 in 1997 (decision 10/CP.3)<sup>49</sup>. Most Parties have identified a designated national authority to act as a primary national contact on AIJ. The COP regularly reviews the progress of AIJ under the pilot phase drawing on reports from Parties, and decides whether or not it should be continued. A first “comprehensive review”, based on decision 5/CP.1, was completed at COP 5 in 1999 and led to the decision to continue the pilot phase beyond 2000 (decision 13/CP.5). Parties agreed that, during the continuation of the pilot phase, the issue of geographical imbalance should be addressed, in particular the lack of projects in Africa and SIDS. Decisions to further continue the pilot phase were adopted by COP 7 (decision 8/CP.7), COP 8 (decision 14/CP.8) and COP 10 (decision 10/CP.10).

The latest report on AIJ (2002)<sup>50</sup> includes more than 150 projects, engaging around one quarter of Parties to the Convention, either as investors or as hosts. Interest in AIJ has steadily grown, especially since the adoption of the Kyoto Protocol. There has been an almost 50 per cent increase in the number of projects since 1997 – possibly with the expectation that these projects may eventually operate under the clean development mechanism or joint implementation introduced under the Kyoto Protocol (see Box 11.2). Non-Annex I Parties make up 70 per cent of host Parties and most projects are concentrated in EITs, although the balance is gradually shifting towards developing countries. Most AIJ projects are in renewable energy and energy efficiency, although the largest projects involve forest conservation, reforestation or restoration. The seventh synthesis report on AIJ will be issued in 2006.

**Relevant COP decisions:**

- Decision 5/CP.1: Activities implemented jointly under the pilot phase
- Decision 8/CP.2: Activities implemented jointly under the pilot phase
- Decision 10/CP.3: Activities implemented jointly under the pilot phase
- Decision 6/CP.4: Activities implemented jointly under the pilot phase
- Decision 13/CP.5: Activities implemented jointly under the pilot phase
- Decision 8/CP.7: Activities implemented jointly under the pilot phase (decisions 6/CP.4 and 13/CP.5)
- Decision 14/CP.8: Activities implemented jointly under the pilot phase
- Decision 20/CP.8: Revised uniform reporting format for activities implemented jointly under the pilot phase, and Annex: Activities implemented jointly under the pilot phase: revised Uniform Reporting Format (URF 01)
- Decision 10/CP.10: Continuation of activities implemented jointly under the pilot phase

**11.B.3. Cooperation and coordination of policies and measures**

While the Convention requires Annex I Parties to adopt national policies and measures to mitigate climate change (Article 4.2(a)) and to report regularly on

<sup>49</sup> This former URF is included in the session report of SBSTA 5: FCCC/SBSTA/1997/4, Annexes III (for AIJ) and IV (for national programmes on AIJ) <<http://unfccc.int/resource/docs/1997/sbsta/04.pdf>>.

<sup>50</sup> Sixth synthesis report on activities implemented jointly under the pilot phase, FCCC/SBSTA/2002/8 <<http://unfccc.int/resource/docs/2002/sbsta/08.pdf>>. COP 10 postponed the preparation of the seventh synthesis report from 2004 until 2006, as Parties had submitted no further information on AIJ.



them (Article 4.2(b)), it does not prescribe particular policies and measures that Annex I Parties should apply. This is left to each Party to determine in accordance with its national circumstances. Article 4.2(e)(i), however, calls on Annex I Parties to “coordinate as appropriate with other such Parties, relevant economic and administrative instruments developed to achieve the objective of the Convention”. Furthermore, Article 7.2(c) provides that the COP is to “facilitate, at the request of two or more Parties, the coordination of measures adopted by them to address climate change and its effects”. No such request has yet been made, and the coordination of measures has not been pursued at the COP level.

COP 4 initiated a process of considering “good practices” in policies and measures. This was also fostered by the Kyoto Protocol which, in its Article 2.1, enumerates specific policies and measures and calls on Parties to share their experience and exchange information on them to increase their effectiveness. As part of the Buenos Aires Plan of Action, decision 8/CP.4 asked the secretariat to prepare a report on best practices in policies and measures, based on Annex I Party national communications and their reviews and additional information submitted by Parties, as well as any other relevant information; and to organize a workshop to assess the best practices in policies and measures on the basis of the conclusions of SBSTA 11. The issue was subsequently often considered under the heading of “good practices” rather than “best practices”, as participants in the workshop had found that the concept of “good practice” was more relevant in the international context, while “best practice” could be to a large extent specific to a particular country<sup>51</sup>.

Within the Marrakesh Accords, decision 13/CP.7 stipulated that cooperation among Annex I Parties to increase the individual and combined effectiveness of policies and measures should come under the guidance of the SBSTA. This work should contribute to the improvement of transparency, effectiveness and comparability of policies and measures. Transparency in reporting on policies and measures in the national communications of Annex I Parties should be enhanced through criteria and quantitative parameters, as appropriate. Furthermore, the work should consider issues of methodology, attribution, and national circumstances. It should also encompass sharing information on how adverse effects of policies and measures – including on developing countries – could be minimized, taking into account information provided by non-Annex I Parties. Decision 13/CP.7 also asked the secretariat to make available the information on policies and measures reported in the third national communications by Annex I Parties. The SBSTA continued its work on policies and measures based on this information and on submissions by Parties<sup>52</sup>. During SBSTA 22 (May 2005), Parties exchanged information and views on the implementation of policies and measures at a round-table discussion.

<sup>51</sup> FCCC/SBSTA/2000/2, paragraph 20 <<http://unfccc.int/resource/docs/2000/sbsta/02.pdf>>. See also FCCC/SBSTA/2001/INF.5 for the report on a further workshop mandated by COP 6 part I <<http://unfccc.int/resource/docs/2001/sbsta/inf05.pdf>>.

<sup>52</sup> FCCC/SBSTA/2002/MISC.7 <<http://unfccc.int/resource/docs/2002/sbsta/misc07.pdf>> and FCCC/SBSTA/2002/MISC.19 <<http://unfccc.int/resource/docs/2002/sbsta/misc09.pdf>>.

SBSTA 22 also considered options for using web-based approaches to sharing experience<sup>53</sup> and decided to consider next steps at SBSTA 24 (May 2006).

**Relevant COP decisions:**

- Decision 8/CP.4: Preparations for the first session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol: matters related to decision 1/CP.3, paragraph 6
- Decision 13/CP.7: Good practices in policies and measures among Parties included in Annex I to the Convention

**11.B.4. Review of activities that lead to increased levels of GHG emissions**

Article 4.2 not only addresses policies and measures that contribute to the objective of the Convention, but also practices that may produce adverse effects. Article 4.2(e)(ii) asks each Annex I Party to “identify and periodically review its own policies and practices which encourage activities that lead to greater levels of anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol than would otherwise occur”. This is reflected in the guidelines for national communications of Annex I Parties, which stipulate that Parties should report on action taken to implement commitments under Article 4.2(e)(ii) of the Convention, and also provide the rationale for such actions in the context of their national communications<sup>54</sup>. For example, the European Union, in its third communication, mentions the intention to phase out all subsidies for fossil fuel production and consumption by 2010, and to undertake an inventory and review of energy subsidies in the Member States, considering their compatibility with climate change objectives.

**11.B.5. Enhancement of sinks and reservoirs of GHGs (Land use, land-use change and forestry)**

In addition to the reduction of GHG emissions at the source, the Convention refers to the enhancement of sinks and reservoirs of GHGs (e.g. in Articles 4.1(b), (d) and 4.2(a)) as an option for mitigating climate change. During the evolution of the Convention process, the term “Land use, land-use change and forestry (LULUCF)” was used to refer to land-use categories that could either increase the removals of GHGs from the atmosphere (e.g. by planting trees or managing forests) or reduce emissions (e.g. by curbing deforestation). LULUCF categories can be a relatively cost-effective way of combating climate change; however, they also have their drawbacks. It may often be difficult to estimate GHG removals and emissions from LULUCF. In addition, GHGs may be unintentionally released if a sink is damaged or destroyed, for example through a forest fire or disease.

Annex I Parties reported in their third national communications a range of policies and measures in the LUCF sector. These focused on afforestation,

<sup>53</sup> As a background document, see FCCC/SBSTA/2004/INF.10

<<http://unfccc.int/resource/docs/2004/sbsta/inf10.pdf>>.

<sup>54</sup> FCCC/CP/1997/7, paragraph 16, <<http://unfccc.int/resource/docs/cop3/07.pdf>>.

reforestation and forest management, and forest programmes with wider policy objectives than mitigating climate change. There was less emphasis on the role of other LUCF activities such as cropland and grazing management, revegetation and the role of soils in carbon sequestration. Parties reported a range of research-based policies and measures including some that have the potential to improve understanding of carbon dynamics and others tackling fire and pest control. The policies and measures in the LUCF sector were implemented using a range of instruments, with regulatory, fiscal and economic instruments being the most common<sup>55</sup>.

The emergence of issues related to LULUCF has stimulated cooperation among many organizations and institutions with forest and agriculture experience. As a result, the UNFCCC secretariat has been collaborating with such bodies as the United Nations Forum on Forests (UNFF), the Food and Agriculture Organization of the United Nations (FAO) and the Collaborative Partnership on Forests (CPF).

**Relevant COP decision:**

Decision 14/CP.11: Tables of the common reporting format for land use, land-use change and forestry

**Box 11.2: LULUCF under the Kyoto Protocol**

According to the Kyoto Protocol's Article 3.3, net changes in GHG emissions and removals from certain land-use change and forestry activities may be used to meet Annex I Parties' commitments under the Protocol. The eligible activities are **afforestation, reforestation and deforestation**. If, taken together, they result in net removals, the corresponding amount will be added to the amount of GHGs a Party may emit (its assigned amount). Conversely, if they result in net emissions, the corresponding amount will be subtracted. Removals generate so-called **removal units (RMUs)** that an Annex I Party can use to help meet its emissions target; emissions must be offset by greater emission cuts or removals elsewhere.

In accordance with Article 3.4 of the Protocol, the Marrakesh Accords (COP 7, 2001) designated a further four eligible activities in the LULUCF sector: **forest management, cropland management, grazing land management, and revegetation**. Parties may elect which of these additional activities they will use to help meet their emissions targets, and the choice is then fixed for the first commitment period.

In order to address potential problems associated with LULUCF (such as uncertainties in accounting, or re-release of GHGs) and to ensure credit would not be given for GHG removals that would have occurred anyway, the Marrakesh Accords determined a number of further **principles** and **rules**.

The **principles** underscore, for example, the need for sound science and consistent methodologies and the importance of conserving biodiversity. Naturally occurring removals should be excluded from the system. Any re-release of GHGs from sinks due to land use, land-use change and forestry activities (e.g. forest fires) must be promptly accounted for.

**Rules** for the accounting of emissions and removals in the first commitment period (2008–2012) are set out in decision 13/CMP.1 and in decision 16/CMP.1. They also limit the LULUCF activities eligible under the CDM to afforestation and reforestation.

<sup>55</sup> See FCCC/SBI/2007/Add.1 & 2.

**11.B.6. Review of the adequacy of Article 4.2(a) and 4.2(b)**

The issue of the adequacy of Article 4.2(a) and (b) of the Convention arises from Article 4.2(d), which was included to address the concerns of some countries that the Annex I Parties' commitment to return their GHG emissions to 1990 levels by 2000 was not sufficient. It provides that the COP shall, at its first session, review the adequacy of Article 4.2(a) and (b), taking into account "the best available scientific information and assessment on climate change and its impacts, as well as relevant technical, social and economic information. Based on this review, the Conference of the Parties shall take appropriate action, which may include the adoption of amendments to the commitments in subparagraphs (a) and (b) ... A second review of subparagraphs (a) and (b) shall take place not later than 31 December 1998, and thereafter at regular intervals determined by the Conference of the Parties, until the objective of the Convention is met". The assessment reports by the IPCC in particular (see Introduction, chapter 1 and chapter 4) have provided information from which Parties have concluded that commitments need to be further strengthened.

**11.B.6.a. First review of adequacy**

The first review was undertaken at COP 1 in 1995 in accordance with Article 4.2(d). The COP concluded, in decision 1/CP.1 known as the "Berlin Mandate", that Article 4.2(a) and (b) were not adequate and launched the negotiations that led to the adoption of the Kyoto Protocol.

The Berlin Mandate began a process to enable the COP "to take appropriate action for the period beyond 2000, including the strengthening of the commitments [of Annex I Parties], through the adoption of a protocol or another legal instrument". The decision reaffirmed the principle of common but differentiated responsibilities. It recalled that the largest share of historical and current global GHG emissions had originated in developed countries, and acknowledged the needs of developing countries to achieve sustained economic growth and to eradicate poverty. The decision therefore provided that the commitments of the developed Parties included in Annex I should be strengthened, while no new commitments should be introduced for non-Annex I Parties. It provided, furthermore, that for Annex I Parties, the process should include drawing up policies and measures and setting quantified objectives for GHG limitation and reduction within specified time frames. The process was to cover all GHGs not controlled by the Montreal Protocol, their emissions by sources and removals by sinks, and all relevant sectors. For non-Annex I Parties, the mandate was to reaffirm existing commitments in Article 4.1 (valid for all Parties), and to continue working on their implementation.

The decision extended to the formation of an open-ended ad hoc group to implement this process, which became known as the Ad hoc Group on the Berlin Mandate (AGBM; see chapter 2).

Of the many submissions made during the AGBM negotiation process on mitigation objectives and their distribution among Parties, a proposal by Brazil on the distribution of emission targets still has a certain relevance. Its scientific

and methodological aspects continue to be discussed on the SBSTA agenda (see Box 11.5).

Based on the work of the eight sessions of the AGBM, the Kyoto Protocol to the Convention was adopted at COP 3 on 11 December 1997. Some core elements of the Protocol are summarized in Box 11.4. Decision 1/CP.3, by which the Kyoto Protocol was adopted, also launched a process for the COP to consider outstanding issues related to the Protocol's implementation, such as more specific rules on the Kyoto mechanisms (Box 11.2) and on LULUCF (Box 11.3).

#### Box 11.3: Core elements of the Kyoto Protocol

Annex I Parties that are also Parties to the Protocol agreed to be legally bound by specific commitments on GHG limitation or reduction. The reduction, or limitation, objectives of all of these Parties are listed in Annex B of the Protocol. The reductions envisaged are calculated to add up to a total of at least 5 per cent below baseline levels for the group as a whole, the normal base year being 1990 (with provisions for flexibility for EITs and certain types of gases). The limitation and reduction objectives are not targeted at a single year, but are calculated as the mean of reductions logged over a five-year **commitment period** from 2008 to 2012. The maximum amount of carbon dioxide emissions units (or the equivalent of such units in the case of other GHGs) that a Party may emit during the commitment period, if it is to fully comply with its emissions target, is referred to as its **assigned amount**.

The Protocol provides for a **comprehensive inclusion of GHGs and sources**. For GHGs, rather than providing values for individual gases, reduction/limitation objectives refer to a basket of four gases (carbon dioxide, methane, nitrous oxide, sulphur hexafluoride) and two groups of gases (hydrofluorocarbons and perfluorocarbons), listed in Annex A of the Protocol. Annex A also contains a list of sectors and source categories. Removals of GHGs by sinks can be counted towards a country's commitments, subject to certain conditions (see Box 11.3).

Although each Party listed in Annex B has its individual reduction or limitation commitment, the Protocol contains a range of provisions for **flexibility**. Parties may form a group whose emissions are counted together rather than individually for each Party, an approach chosen by the European Union. Furthermore, the Protocol introduces three **flexibility mechanisms** allowing countries to achieve a proportion of their commitments by earning credits for GHG emissions avoided or GHG removals achieved in other countries (see Box 11.2). The Protocol also requires the COP/MOP to approve procedures and mechanisms relating to compliance at its first session (see Box 2.3 in chapter 2).

The Kyoto Protocol entered into force on 16 February 2005. It includes provisions for reviewing commitments so that they can be strengthened over time. It states that negotiations on targets for the second commitment period are to start in 2005, by which time Annex I Parties which are Parties to the Protocol should have made demonstrable progress in meeting their commitments. Accordingly, COP/MOP 1 decided to initiate a process to consider further commitments by Annex I Parties for the period beyond 2012. An ad hoc working group of Parties to the Protocol was established to conduct the work and report at each session of the COP/MOP (decision1/CMP.1). The group was requested to complete its task so as to avoid any gap between the first and second commitment period (see chapter 2).

**Relevant COP decisions:**

- Decision 1/CP.1: The Berlin Mandate: Review of the adequacy of Article 4, paragraph 2(a) and (b), of the Convention, including proposals related to a protocol and decisions on follow-up
- Decision 1/CP.3: Adoption of the Kyoto Protocol to the United Nations Framework Convention on Climate Change

**11.B.6.b. Second review of adequacy**

As Article 4.2(d) provides for the second review of the adequacy of Article 4.2(a) and (b) to take place no later than 31 December 1998, this issue was included on the agenda of COP 4 (November 1998). Despite intensive consultations, it proved impossible to reach any agreement on this matter. Parties agreed that the existing commitments of Annex I Parties were not adequate and that the Kyoto Protocol was an important step towards achieving the ultimate objective of the Convention. However, they failed to reconcile their differences on how to conduct the review and on what steps needed to be taken. This was mainly due to sharply differing views between Annex I and non-Annex I Parties over the scope of the review (i.e. whether it encompassed the possibility of discussing the future role of developing countries).

In line with rule 16 of the draft rules of procedure (see chapter 2)<sup>56</sup>, the item was tabled again on the provisional agenda for COP 5 in 1999. At COP 5, the Group of 77 and China proposed an amendment to the wording of this item as follows: "Review of the adequacy of **implementation** of Article 4.2(a) and (b)"<sup>57</sup>. There was no agreement on that proposal, and the item was held in abeyance. During the session, the President consulted with Parties but without achieving consensus.

Since COP 5, the item has been included on the provisional agenda of each COP with a footnote reflecting the amendment proposed by the Group of 77 and China. Given the continuing lack of agreement, the item has been held in abeyance at every COP, although successive Presidents have consulted with Parties on possible ways of achieving consensus. Each President has included information on the outcome of the consultations in their report to the COP.

SBSTA 17 (October/November 2002) invited the scientific community, including international assessment programmes, to continue research on the scientific and methodological aspects of the proposal and to make results available to Parties. It also decided to review progress at SBSTA 23 in November 2005.

A third expert meeting on the Brazilian proposal (September 2003 in Berlin, Germany) was organized by the governments of Brazil, the UK, and Germany, and a side-event on the issue took place at SBSTA 20 in June 2004. The SBSTA agreed to return to the consideration of scientific and methodological aspects of the proposal at its twenty-fourth session (May 2006).

<sup>56</sup> Rule 16 provides that "any item on the agenda of an ordinary session, consideration of which has not been completed at the session, shall be included automatically in the agenda of the next ordinary session, unless otherwise decided by the Conference of the Parties".

<sup>57</sup> Bold type not in the original.

#### Box 11.4: Scientific and methodological assessment of contributions to climate change: the Brazilian proposal

As part of the negotiations on the Kyoto Protocol, the delegation of Brazil proposed, at AGBM 7 (July–August 1997), setting differentiated emission reduction targets for Parties according to the impact of their cumulative historical emissions, starting from 1840, on the global-average surface temperature<sup>58</sup>. The proposal suggested that reductions towards an overall emission ceiling for all Annex I Parties (30 per cent below 1990 levels by the year 2020) were to be shared among individual Annex I Parties proportional to their relative share of responsibility for climate change. In order to determine this share, the proposal suggested using an agreed simple climate model.

While some aspects of the proposal have been overtaken by the outcome of the Kyoto Protocol negotiations, there is continued interest in its scientific and methodological aspects. They are centred on the question of how, if at all, responsibilities for a global rise in temperature can be calculated from historical emissions. COP 3 referred the scientific and methodological aspects of the proposal to the SBSTA<sup>59</sup>.

The Brazilian government organized a workshop on its proposal in the margins of COP 4 in 1998 and an expert meeting in its own country in 1999. It presented revised versions of its proposal in 1998 and again in 2000. SBSTA 11 (October/November 1999) asked the secretariat to coordinate a review of the revised proposal by experts. It also invited Parties to submit information.

SBSTA 14 (July 2001) took note of the progress achieved on the issue, including the conclusions of an expert meeting held in May 2001<sup>60</sup>, and encouraged Parties to pursue and support the ongoing research effort. It also asked the secretariat to continue its work on the proposal.

In March 2002, the secretariat encouraged research institutions active in the field of climate change modelling to share information to provide, as a first step, new and comparable results on contributions to climate change. The secretariat organized a second UNFCCC expert meeting (September 2002 in Bracknell, UK) to assess the preliminary results provided by the research institutions, to encourage cooperation between developing and developed country scientists and to identify next steps, including future analysis<sup>61</sup>.

#### 11.C. Measures to mitigate climate change: non-Annex I Parties

According to the guidelines for the preparation of national communications from non-Annex I Parties adopted at COP 8 (decision 17/CP.8 and Annex; see chapter 18), each Party is to provide the COP with a general description of steps taken or envisaged towards “formulating, implementing, publishing and regularly updating national and, where appropriate, regional programmes containing measures to mitigate climate change”. More specifically, “based on national circumstances, non-Annex I Parties are encouraged to provide, to the extent their capacities allow, information on programmes and measures implemented or planned which contribute to mitigating climate change ..., including, as appropriate, relevant information by key sectors on methodologies, scenarios, results, measures and institutional arrangements”. Parties have indeed reported a wide range of measures in their initial communications with varied scope and level of detail. Most measures relate to the energy, agriculture, LUCF and waste management sectors<sup>62</sup>.

<sup>58</sup> Contained in FCCC/AGBM/1997/MISC.1/Add.3

<<http://unfccc.int/resource/docs/1997/agbm/misc01a03.pdf>>.

<sup>59</sup> FCCC/CP/1997/7/Add.1, section III.3 <<http://unfccc.int/resource/docs/cop3/07a01.pdf>>.

<sup>60</sup> Contained in FCCC/SBSTA/2001/INF.2 <<http://unfccc.int/resource/docs/2001/sbsta/inf02.pdf>>.

<sup>61</sup> The report of the expert meeting is contained in FCCC/SBSTA/2002/INF.14

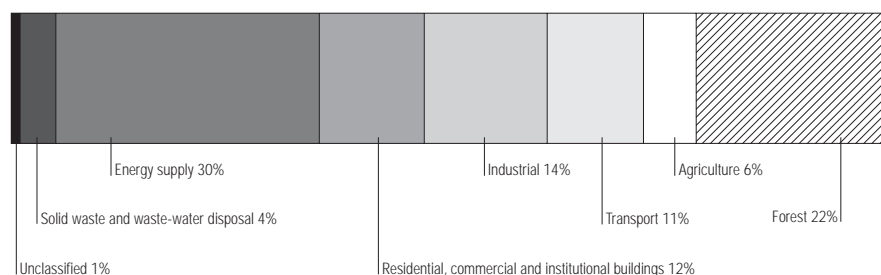
<<http://unfccc.int/resource/docs/2002/sbsta/inf14.pdf>>.

COP 11 (November–December 2005) introduced a new agenda item on reducing emissions from deforestation in developing countries. Parties recognized the need to address this issue as part of mitigation. Topics under consideration include scientific, technical and methodological issues. Parties will also exchange relevant information and experiences, including policy approaches and positive incentives. SBSTA 24 (May 2006) took up this item and will report on it at its twenty-seventh session, drawing on submissions by Parties and accredited observers.

According to the sixth compilation and synthesis of initial national communications from non-Annex I Parties<sup>63</sup>, sequestration of carbon dioxide emissions by the LUCF sector in most non-Annex I Parties offset the GHG emissions originating from this sector. Roughly half of the reporting Parties also identified measures to limit emissions and enhance removals by sinks in the LUCF sector.

According to Article 12.4 of the Convention, developing country Parties may also propose, in their national communications, mitigation projects as candidates for financing. These could include specific technologies, materials, equipment, techniques or practices that would be needed to implement such projects, together with, if possible, estimates of removals of GHGs and an estimate of the consequent benefits. Many Parties have submitted such project proposals in their national communications. The secretariat has developed a database for them and, following decision 12/CP.4, compiles and makes available to Parties a list of them. Some of the projects have already been implemented with funding from the Global Environment Facility (GEF; see chapter 13) or from bilateral and other sources. As of March 2005, the list contained 469 project concepts and profiles proposed for financing<sup>64</sup>. SBI 23

**Figure 11.2: Distribution of project proposals by sector in developing countries**



<sup>62</sup> See FCCC/SBI/2005/18/Add.3 <<http://unfccc.int/resource/docs/2005/sbi/eng/18a03.pdf>> and FCCC/SBI/2004/INF13

<sup>63</sup> See FCCC/SBI/2005/18/Add.3

<sup>64</sup> FCCC/SBI/2005/INF2 <<http://unfccc.int/resource/docs/2005/sbi/eng/inf02.pdf>>. For a more comprehensive list also including proposals already implemented, approved for funding, or planned for implementation, as well as prioritized areas/activities for mitigation or mitigation options, see FCCC/SBI/2004/INF13 <<http://unfccc.int/resource/docs/2004/sbi/inf13.pdf>>.



**Box 11.5: Measures to combat climate change in non-Annex I countries**

Non-Annex Parties have reported the following measures that combat climate change in their national communications:

**Energy supply**

- improving energy efficiency and conservation;
- increasing transformation efficiency;
- modernizing thermoelectric utilities;
- reducing losses in transmission and distribution;
- developing plans to promote rural electrification and use of renewable energy sources.

**Energy demand:**

- promoting information in the transport, residential, commercial and industrial subsectors.

**Agriculture:**

- reducing methane emissions in rice cultivation through improved farm management practices;
- changing traditional farm practices;
- reducing areas under cultivation;
- shifting to shorter-duration rice varieties;
- rotating crops;
- diversifying and intensifying crops;
- increasing areas under directly seeded rice;
- providing training and dissemination of information on mitigating methane emissions from rice paddies;
- improving water management through soil aeration and periodic drainage of paddy fields;
- adopting intermittent irrigation systems;
- using chemical compounds to inhibit the production of methane;
- improving cattle management practices;
- optimizing livestock populations;
- improving livestock production through diet;
- using nutrient supplement urea-molasses-mineral blocks;

- supplementing poor quality roughage with legumes and/or low-cost agricultural by-products;
- expanding pasture and forage conservation for dry-season feeding;
- improving collection, use and storage of organic waste;
- using animal waste for energy production.

**Land-use change and forestry:**

- conserving existing forest cover;
- developing commercial plantations, agroforestry;
- preventing and controlling forest fires;
- controlling diseases and pests;
- controlling acid rain damage;
- creating woodland, low-impact logging;
- improving timber utilization;
- converting low productivity lands into grasslands and rangelands.

**Waste management:**

- minimizing waste at the production, distribution, consumption and disposal stages;
- recycling waste;
- improving organic waste collection, utilization and storage systems;
- improving waste-water treatment;
- using waste for energy production;
- incinerating waste;
- regulating to control urban industrial pollution.

asked the Consultative Group of Experts (CGE) to make recommendations on ways of improving the reporting of projects identified in national communications from non-Annex I Parties in accordance with Article 12.4 of the Convention. It also asked the CGE to report to, and advise, the SBI, at its twenty-sixth session (May 2007), on ways of improving access to financial and technical support for such projects. Furthermore, in its decision 5/CP.11, the COP reiterated its request to the GEF to assist non-Annex I Parties in formulating and developing project proposals identified in their national communications, when Parties are formulating their national programmes to address climate change issues, and to report on it to the COP.

**Relevant COP decisions:**

- Decision 12/CP.4: Initial national communications from Parties not included in Annex I to the Convention
- Decision 17/CP.8: Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, part I: UNFCCC reporting guidelines on annual inventories.
- Decision 5/CP.11: Additional guidance to an operating entity of the financial mechanism

**11.D. Other areas of relevance for mitigation**

**Education, training and public awareness:** the New Delhi work programme on Article 6 of the Convention recognizes the importance of Article 6 in engaging all in developing and implementing policies on climate change, consistent with sustainable development goals. Under the programme, Parties are called upon to inform the public about causes of climate change and sources of GHG emissions, as well as actions that can be taken at all levels to address climate change (see chapter 16).

The frameworks for **capacity-building** in developing countries and in EITs adopted at COP 7 (decisions 2/CP.7 and 3/CP.7; see chapter 17) include issues around GHG inventories, managing emission databases, and systems for collecting, managing and using activity data and emission factors. They also include assessments for implementing mitigation options. The technical paper<sup>65</sup> investigating the range and effectiveness of these activities in developing countries confirms that GHG emissions inventories is one of the areas where the need for capacity-building is high. Parties are also assisted by the web-based technology information clearing house TT:CLEAR that provides information on methods, models, and tools to assess mitigation and adaptation options and strategies.

**Relevant COP decisions:**

- Decision 2/CP.7: Capacity-building in developing countries (non-Annex I Parties)
- Decision 3/CP.7: Capacity-building in countries with economies in transition

<sup>65</sup> *The range and effectiveness of capacity-building in developing countries relating to decision 2/CP.7*, FCCC/TP/2004/1 <<http://unfccc.int/resource/docs/tp/tp0401.pdf>>.